Joint Jurisdictional Review of the Metrology Procedures

Issues Paper

Prepared by KPMG in conjunction with the Jurisdictional Regulators

Essential Services Commission (Victoria)
Essential Services Commission of South Australia
Independent Competition and Regulatory Commission (ACT)
Independent Pricing and Regulatory Tribunal (NSW)
Office of the Tasmanian Energy Regulator
Queensland Competition Authority

August 2003

NOTICE OF CODE CONSULTATION

This is to provide notice to all National Electricity Market Code Participants, Intending Participants and Interested Parties of the consultation that the Jurisdictional Regulators of the ACT, NSW, Queensland, South Australia, Victoria and Tasmania are jointly conducting in connection with metering installation types 5 and 6 and the metrology procedures that have been implemented in the participating jurisdictions, under Clause 7.13(f) of the National Electricity Code ("the Code").

Matter under consultation

Clause 7.13(h) of the Code provides:

"*The review conducted in accordance with clause 7.13(f) must be conducted in accordance with the Code consultation procedures and must include consultation with Interested Parties. A copy of the report must be provided to the ACCC and made publicly available*."

Invitation to make submissions

This Issues Paper has been developed by the Jurisdictional Regulators as the first stage of the review. The Jurisdictional Regulators invite written submissions on this paper.

Please identify any information in your submission, which you consider to be confidential. The Jurisdictional Regulators may require you to give reasons as to why you regard information as confidential. The Jurisdictional Regulators reserve the right to disregard material for which confidentiality is claimed but which it does not consider confidential. Further, material that the Jurisdictional Regulators accept as confidential may be accorded less weight in the decision-making process than material that is published and withstands challenge and exposure to the market.

Closing date

Submissions should be forwarded by Friday 12 September 2003. Late submissions will only be considered by the Jurisdictional Regulators at their discretion. If the submission is late, the following should be included for consideration by the Jurisdictional Regulators:

(i) the reason for the lateness; and

(ii) the detriment to you if the Jurisdictional Regulators fail to consider your submission.

Contact details

The Jurisdictional Regulators request that submissions be forwarded in electronic format as all submissions will be published on the websites of the Jurisdictional Regulators and/or the NEMMCO website (other than material in respect of which confidentiality is claimed).

Electronic submissions should be provided by Friday 12 September 2003 addressed to:

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Executive summary

The competition reforms of the 1990s have transformed Australia's electricity sector. These reforms included the separation of the previously integrated supply chain, introduced competition between generators for supplying electricity and allow customers the choice of retailer. The reforms have brought the network sector under access and price regulation and saw the creation of a single wholesale market for electricity known as the National Electricity Market ("NEM"). The NEM currently consists of five Australian states and territories – the Australian Capital Territory ("ACT"), New South Wales ("NSW"), Queensland, South Australia and Victoria. Tasmania intends joining the NEM following completion of an undersea connection between Tasmania and Victoria.

Reform of the electricity sector has been designed to increase the efficiency of the sector for the long-term benefit of all consumers and it is recognised that the reforms have already brought many benefits. Competitive pressures have seen increased generator efficiency and availability, and additional generation investment has occurred that seems to have been driven by market needs.

The reforms to allow customers to choose their retailer have now been introduced in most states participating in the NEM[1]. These reforms allow a customer to choose the price and service package that best meets the customer's need, from a range of retailers. The ability of this retail market to deliver a range of price arrangements allows customers to choose how to consume power to gain maximum benefit for themselves and the electricity market as a whole. Such action by customers is an element of demand side participation in the market. Demand side participation is considered to have overall market benefits as well as benefits to individual consumers.

However, it is also recognised that there are reform areas that still need to be addressed[2]. A key feature of competitive markets is the active participation of both the supply and demand sides. Without this, competition is blunted and the potential benefits of competition may not be fully realised. The recent review of the energy markets concluded that one of the reasons "there is a relatively low demand side involvement in the NEM [is that] residential consumers do not face price signals"[3]. One of the objectives of this review is to identify whether there are specific barriers to consumers adopting metering solutions and other technology that would enable them to receive and to choose whether to respond to these price signals.

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[1]Except in Queensland where only large customers (those consuming more than 200 MWh per annum) are able to choose their retailer.

[2] Council of Australian Governments, Energy Market Review, *Towards a Truly National and Efficient Energy Market*, p 8

[3] Council of Australian Governments, Energy Market Review, *ibid*, p 174

Purpose of this Review

Full retail competition ("FRC") was introduced into the electricity markets in NSW and Victoria in January 2002, in South Australia in January 2003 and in the ACT in July 2003. In preparation for the introduction of FRC, amendments to the National Electricity Code ("the Code") were authorised by the Australian Competition and Consumer Commission ("ACCC") in August 2001. These changes, referred to as the FRC code changes, provide for:

- The introduction of transitional metering arrangements that recognise the existing domestic metering infrastructure and accommodated the jurisdictional timeframes and policies for introducing FRC. That is, the FRC Code changes allowed small consumers to transfer retailers on the basis of basic meters with profiling in addition to manually read interval meters;
- A metrology coordinator, to be appointed in each jurisdiction, to be responsible for the development of metrology procedures that facilitate the conversion of metering data into a format suitable for use in the current wholesale markets settlement system; and
- Clarification of the roles and responsibilities of the responsible person for metering.

The FRC code changes allowed the existing basic meters (with profiling) to be used as a basis for settlement when small consumers transfer retailers. The ACCC was concerned, however, that in the longer term a move towards interval metering and a single metrology procedure were required to facilitate the further development of competition. The Code was therefore amended by the ACCC, requiring a review of the metrology procedures established in each NEM jurisdiction ("the Review"). The Review is to be conducted jointly by the relevant NEM jurisdictional regulators by 31 December 2003.

The Review must consider whether there are barriers to consumers adopting metering solutions and other technology options that may allow demand side participation in the market and may lead to economically efficient outcomes. Where such barriers are identified, the Review must propose recommendations to reduce such barriers. The Review must include consideration of meter ownership, technology, and effects on the wholesale and retail pricing signals and consumption decisions. Regard must be had to jurisdictional requirements in relation to new and replacement meters.

Additionally, the Review is to consider options for developing nationally consistent metrology procedures and will consider whether the current ring fencing requirements are adequate for the proposed metering or metering data services provisions[4].

This Issues Paper is the first paper in connection with the Review. It develops the issues associated with the Review and considers options for removing any possible barriers to consumers adopting economically efficient metering solutions and other technology, and for

[4] National Electricity Code, clause 7.13(i)

nationally consistent metrology procedures. The Issues Paper is designed to commence consultation with stakeholders and other interested parties, on the issues. Responses to this paper will then be considered in the development of the draft report.

Developing the assessment framework

An important element of the Review is to develop a framework that will be used to discuss whether barriers exist to customers adopting economically efficient metering solutions or other economically efficient technology. The framework will also be used as a basis to discuss and compare any options that are identified to remove these barriers. The assessment framework has been developed by reference to the Code requirements that are relevant to this Review.

The proposed assessment framework consists of the following criteria:

- *Economic efficiency* – potential barriers are assessed in terms of their economic costs and benefits by reference to productive, allocative and dynamic efficiency.
- *Practicality* - the costs and benefits of removing any barriers are also assessed from a practical perspective.
- *Equity* - the incidence on particular customers and market participants of the costs and benefits of any barriers is assessed.

The Code, consistent with economic theory, creates a strong assumption that "economic efficiency" will be achieved by allowing customers to make choices in regard to their electricity retailer, the way in which they are metered, and their electricity consumption. These choices are being provided in the expectation that the competitive process will lead to improvements in the efficiency with which services are provided, electricity is priced and will enable demand side participation. More importantly, these choices are being provided because improvements in the efficiency with which services are provided and electricity is priced, are expected to benefit consumers[5].

Comments are sought in this Issues Paper as to the appropriateness of this assessment framework and the assumptions made in the Code.

The institutional arrangements that are possible barriers to the adoption by consumers of economically efficient metering solutions and other technology, and which are considered in this Issues Paper using the assessment framework, are:

- The current metering arrangements;
- The current metering services arrangements;
- The current meter ownership model; and

[5] Although some consumers may not see improvements in the way that electricity is priced because they may choose not to change their consumption of electricity.

- Other legal and regulatory issues, including the flexibility of distribution and first tier retail tariffs and the "non reversion" policies for interval meters.

These possible barriers to the adoption of economically efficient metering and other technology are discussed further in the following sections.

Metering and other technology and the assessment framework

The potential benefits of allocative efficiency via more cost reflective pricing have been recognised by a variety of policy makers and regulators, including the ACCC, the Independent Pricing and Regulatory Tribunal ("IPART"), the Essential Services Commission of South Australia ("ESCOSA") and the Essential Services Commission (Victoria) ("ESC"). When provided with cost reflective price signals, consumers are then in a position to make appropriate decisions about their electricity consumption and decide whether to change, or to not change, their behaviour. Accordingly, consumers may choose to change their consumption pattern so they do not pay more under a cost reflective tariff regime, or they may choose to pay the resultant cost reflective tariffs.

In practice, gaining the allocative efficiencies is predicated on the following assumptions:

- That the retailers will offer more cost reflective tariffs to customers in a competitive retail market;
- That customers will choose the more cost reflective offers made by retailers; and
- That customers will make informed decisions to either change their consumption pattern, or to pay the resultant cost reflective tariffs.

Currently large customers that change retailers are required to have an interval meter installed. However smaller customers that change retailers may choose to install an interval meter or retain their basic (non-interval) meter, to which a profile is applied to obtain interval data for wholesale market settlement. Profiling was provided as an option for smaller customers as it provides the data necessary to perform wholesale settlement without requiring existing meters to be replaced with interval meters. Profiling therefore provided a potential opportunity to capture the productive efficiency improvements of competition (that is, some of the benefits), without imposing the costs associated with interval meters, and without the need to roll-out interval meters prior to FRC commencing.

An important consideration when examining barriers is whether alternative metering solutions and other technology options would lead to more efficient outcomes than would result from the current metering arrangements.

The energy prices paid by large users with interval meters typically reflect their measured profile[6]. Amongst smaller users, the likelihood of price differentiation between individual

[6] This does not necessarily imply that large customers receive half hourly price signals. However, the offers made to large customers are more likely to consider the actual profile of that customer.

customers, even with interval meters installed, is less likely. It is more likely that, with interval meters installed, groups of consumers can be differentiated based on the average characteristics for that group. And hence, there may be efficient price differentiation between these groups of consumers.

It might be the case that non-interval meters (by protecting customers with a high cost load) distort the retailers' incentive to introduce these more cost reflective tariffs because it restricts their ability to provide any differentiation of tariffs to different groups of consumers.

A further consideration in achieving economic outcomes is the need for consumers to see materially different cost reflective tariffs when they have interval meters.

The current metering arrangements may therefore create a barrier to all consumers, or to groups of consumers, adopting metering solutions and other technology options that are economically efficient given no transaction costs. However, an important issue to consider is whether these other options increase efficiency given the costs that would be incurred to obtain the benefits.

Accordingly, comments are sought as to whether these current metering arrangements are considered to be a barrier to the adoption of economically efficient metering solutions and other technology options.

Achieving efficiency with metering solutions and other technology

The metering solutions and other technology options that may lead to economically efficient outcomes and have therefore been considered in this Issues Paper are:

- Accumulation meters (non time of use, or single rate, meters):
  - With additional profiling algorithms:
    - By reducing the area over which each profile applies; and
    - By increasing the number of profiling algorithms that are applied in each profile area;
  - With improved profiling algorithms, by netting off large customers that are not representative of those customers on the profile;
- Time of use meters:
  - With existing profiling algorithms;
  - With additional profiling algorithms, which apply only to those customers with time of use meters;
- Interval meters:
  - That are manually read;
  - That are remotely read; and

  - That have two way communications capability.
- Switching of peak loads and off peak loads;
  - Using a static form of load control, for example, time switches; and
  - Using a dynamic form of load control, for example, ripple control; and
- Demand management options.

The options for deploying metering or other technology consist of:

- "Market based" approaches, whereby the customer has the option to install an economically efficient metering solution. The benefits under "market based" approaches principally accrue to an individual. This approach is currently available; or
- More accelerated roll outs, whereby targeted groups of customers are required to have economically efficient metering solutions or other technology installed based on a timetable.

The costs of rolling out such metering solutions or other technology to all customers are likely to be substantial and it is to be determined if such a rollout is cost effective and hence efficient overall. A number of options for deploying meters have been identified and discussed in which meters are rolled out to targeted groups of consumers. If an accelerated approach to deploying meters is adopted, it would need to be based on a comprehensive cost benefit study that optimises the costs of the roll out relative to the benefits associated with that roll out.

Comments are sought in relation to the metering solutions and other technology options that are discussed, and in relation to the deployment options.

Responsibility for metering services

Customer metering has assumed an enhanced role in the competitive market. Metering does not just determine the customer bills but settlement between the retailer and the market, and the commercial arrangements between the retailer and the network. Determining who is responsible for, or who can own, the meter is important to the operation of the market and to innovations that benefit customers.

The distributor is currently responsible for first tier metering under various jurisdictional instruments. For second tier customers, the "Responsible Person" has responsibility for the supply, installation and maintenance of meters, under the Code. The Responsible Person may be either the retailer[7], or the distributor, where nominated by the retailer[8].

[7] National Electricity Code, clause 7.2.3

[8] National Electricity Code, clause 7.2.2

Each jurisdiction that has introduced FRC has, however, a transitional derogation[9] to the Code to allow the distributor to exclusively be the Responsible Person for small second tier customers. If the derogations expire, and without any other relevant Code changes, metering services for small customers will not exclusively be the responsibility of the distributor as it has been.

Exclusivity was originally introduced as a transitional measure to address issues of cost and complexity which would have arisen had competition in metering services been introduced simultaneously with the introduction of FRC. This transitional measure was justified on the basis that the benefits provided by exclusivity (over the transitional period) would outweigh the costs.

The key advantage of allowing the exclusivity derogations to expire after the transitory period is that it may facilitate innovation, both in terms of the types of meters installed and the way in which those meters are read. Currently, small customers, and their retailers, are generally constrained to the distributor's standard offering.

While the existing arrangements may be a barrier to the adoption of economically efficient metering solutions and other technology, there is, however, a counter argument that the economies of scale from exclusivity may minimise costs and enable innovation. Additionally, competitive metering services may inhibit the productive efficiencies associated with retail competition by increasing the potential for:

- Meter churn;
- Increased metering costs, including additional costs due to the stranding of assets, resulting in a lack of effective competition; and
- Introducing operational complexities, including maintenance and testing of meters, ensuring universal metering, coordination of processes across multiple parties, and load control.

The benefits of introducing competition in metering services need to be viewed in the context of the relative importance of metering services compared to the total retail service. That is, a small change in the effectiveness of retail competition could result in greater change in the costs or benefits to consumers than the introduction of competition in metering services.

A number of options for removing any barrier that the current metering services arrangements may be creating to the adoption of economically efficient metering solutions or other technology are considered in this Issues Paper. These options include introducing competitive metering services for large first tier customers, introducing competitive metering services for some or all small customers, for some or all metering services in the shorter or

[9] In the case of NSW and Victoria, the derogations expire on 1 July 2004, the derogation for South Australia ceases on 1 July 2005 while the derogation for the ACT expires on 28 February 2006.

longer term, and allowing metering services to be provided to small customers on an exclusive basis in perpetuity. Comments are sought in response to these options.

Meter ownership

The Code specifically requires this Review to consider whether "meter ownership acts as a barrier to customer switching".[10] Furthermore, if the related metering services arrangements are changed, then meter ownership options also need to be explored.

Legislation and supporting regulations in each of the jurisdictions generally do not place any restrictions on which party may own a meter[11], however generally customers do not own meters. Historically, distributors have included meters in their regulatory asset base and have therefore recovered the costs of these meters through their charges. The key advantage of alternative meter ownership arrangements is the potential to facilitate innovation, both in terms of the types of meters installed and the way in which those meters are read as retailers and customers are not constrained to the distributor's standard meter. While ownership of meters by the distributor may be a barrier to the adoption of economically efficient metering solutions and other technology there is a counter argument that the economies of scale arising from continuing to vest ownership of meters with the distributor may enable lower costs.

If a party, other than the distributor, owns the meters for small customers, then this may create a barrier to that customer switching retailers. This barrier may arise as a result of:

- A meter, owned by a party other the distributor, being of a type that is not commonly used, and:
  - Can only be read by a limited number of Metering Providers, that may not be accessible to the new retailer;
  - Can or will only be tested by a limited number of Metering Providers, that may not be accessible to the new retailer; or
  - Does not provide metering data in a form that is compatible with the new retailer's tariff;
- The potential for meter churn and stranded costs;
- The potential for increased metering costs;
- The potential barrier to entry to retailers that do not have the skills to take responsibility for meter ownership, resulting in reduced choice of retailers and subsequently offers for consumers; and
- The potential for anti-competitive retailer behaviour.

[10] National Electricity Code, clause 7.13(g)(1)(i)

[11] Except in Victoria where customers cannot own their meters

This Issues Paper considers and seeks comments on a range of meter ownership options, including vesting of ownership with the distributor, retailer, customer, a third party, or with a choice of these parties.

Other legal and regulatory issues

A possible legal and regulatory barrier to the adoption of economically efficient metering solutions and other technology that is discussed in this Issues Paper is the flexibility available to distributors to vary the structure of distribution tariffs and for retailers to vary the retail tariffs for first tier customers to make them more efficient. Comment is sought as to whether this is a barrier.

Whilst an appropriate metering technology can enable more cost reflective tariffs, the benefits of these cost reflective prices can only be fully realised where there are both efficient distribution and retail tariffs. In the first instance, cost reflective distribution tariffs can assist in achieving efficiencies in the network, and these tariffs need to be reflected in the retail tariffs faced by customers. Where there are restrictions placed on the ability for distributors to develop cost reflective tariffs, and the ability of those tariffs to be reflected in retail tariffs, the potential benefits of adopting an efficient metering solution or other technology will be diminished.

The same flexibility required in the setting of distribution tariffs is also required in the setting of retail tariffs for first tier customers. The ability to capture allocative efficiencies will, however, be reduced significantly if there are restrictions on retailers in the setting of first tier retail tariffs, because the majority of small consumers are still first tier.

Retail tariffs for second tier customers are set in a competitive market and are generally subject to market forces.

Other possible legal and regulatory barriers are:

- The “non reversion” policies that are applicable to interval meters. The “non reversion” policies were originally implemented to ensure the efficient use of interval meters installed, whilst recognising that the costs of collecting and processing data from interval meters are higher than for other meters. In jurisdictions where interval meters are required to be read as interval meters, the higher costs incurred may reduce the rate at which interval meters are installed by the distributor. However it is unclear as to whether this is a function of the “non reversion” policy or other factors;
- The period over which metering data is stored. The costs associated with interval meters may be increased if the data from these meters is required to be stored for a longer period than required;
- The provision of access to metering data. The costs associated with interval meters may be increased if the data is required to be provided to a range of parties that do not necessarily require the disaggregated data; and

- The enforcement of unique Australian metering standards, which may inhibit the sales of meters available globally, in Australia.

Comment is sought as to whether these are barriers to the adoption of economically efficient metering solutions and other technology, and whether there are other potential legal and regulatory barriers that should be considered.

Ring-fencing

In its determination on the FRC Code changes, the ACCC expressed concern that

> *... joint distribution/retail businesses may misuse their position to deter other retailers from entering the market. .*[12]

Accordingly, the ACCC added a further requirement to review the effectiveness of the current ring-fencing arrangements with respect to their ability to[13]:

> *(1) prevent anti-competitive conduct;*
>
> *(2) provide transparency; and*
>
> *(3) provide confidence in the integrity of the competitive metering arrangements between the Distribution Network Service Providers, Customers, and Metering Providers.*

The jurisdictional regulators have decided to include part (3) of the requirement above as part of this joint review.

Separation (ring-fencing) of monopoly elements of the market from competitive elements may be required to ensure that the power derived from a monopoly business does not lead to adverse outcomes in the competitive sectors. The effective operation of the market may require:

- Ring-fencing between the distributor and its related retailer; and
- Ring-fencing between the distributor's metering business that is provided as a prescribed service, the metering business that is provided as a non-prescribed service and the metering business that is provided as a contestable service.

Ring-fencing can take the form of:

- Legal separation;
- Accounting separation; and
- Operational separation.

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[12] ACCC, *Determination on Full Retail Competition and Registration of Code Participants,* August 2001, p.24

[13] National Electricity Code, clause 7.13(i)

In discussing ring-fencing requirements in the context of this Review, regard has been had to whether the arrangements ensure appropriate operational separation, ensure non-discriminatory access, and apply to a distributor's metering business.

The ring-fencing arrangements vary by jurisdiction. The regulators in ACT, NSW, Queensland and South Australia have published ring-fencing guidelines requiring operational separation, however, there are transitional requirements in NSW and South Australia. Furthermore, the guidelines in NSW specifically refer to the ring-fencing of the distributor's services provided by Accredited Service Providers ("ASPs"), rather than ring-fencing in the broader context. The regulators in Tasmania and Victoria have not published ring-fencing guidelines, but the Victorian distribution licences require non-discriminatory access to distribution services.

Comments are sought as to whether these ring-fencing arrangements are appropriate.

Nationally consistent metrology procedures

Metrology procedures have been developed in each of the jurisdictions where FRC has been introduced to facilitate the conversion of metering data into a format suitable for use in the wholesale markets settlement system. The metrology procedures are a mechanism for communicating jurisdictional policy decisions relating to some aspects of FRC to the market. The ACCC is concerned that the benefits of FRC would be reduced without nationally consistent metrology procedures and therefore the Code requires that this Review "consider options for a single nationally consistent metrology procedure for each of metering installation types 5, 6 and 7"[14].

In the development of the published metrology procedures considerable consistency across jurisdictions has already been achieved. Key jurisdictional differences in the metrology procedures relate to specific jurisdictional polices for FRC including the form of profiling that is applicable in each jurisdiction.

A range of options have been identified and discussed in this paper for increasing the extent to which the metrology procedures are nationally consistent. These range from retaining jurisdictional metrology procedures but incorporating some amendments so that they are more consistent through to transferring part or all of the current metrology procedures to NEMMCO instruments. Such a new common NEMMCO document would include tables identifying the different jurisdictional positions in a similar way to other existing NEMMCO procedures. Most of these options require changes to the Code prior to implementation. Comment is sought in relation to these options.

[14] National Electricity Code, clause 7.13(f)(2)

Next steps

The next section is a summary of the issues that have been developed in this paper and which are likely to be the focus of responses to this paper. Following consultation on the issues a draft report will be developed which will take into account the matters raised by stakeholders. It is anticipated that the draft report will be released for consultation in October 2003. Section 1.3 of this report contains more details of the timetable for the Review and the Notice of Code Consultation at the front of the paper has details about how to make submissions on the issues raised in this paper.

Summary of issues

A list of issues identified in this paper is presented in the table below. The issues are listed in the order in which they appear in this paper. The reference number refers to the relevant section in this paper.

Issue no.	*Ref.*	*Issue Description*
1	2	In this section an assessment framework has been developed for identifying and discussing barriers to the adoption of economically efficient metering solutions and other technology. Comment is sought in relation to this assessment framework. Are there any additional assessment criteria that should be considered? Considering the interrelationship of the different concepts, is the approach to assessing the issues appropriate?
2	3.5	Comment is sought in relation to whether the current jurisdictional metering arrangements are a barrier to all consumers, or groups of consumers, adopting economically efficient metering solutions or other technology options. Are there allocative efficiencies that may be captured by adopting alternative metering solutions or other technology options?
3	3.6	In this section, a range of metering solutions and other technology options have been considered. Comment is sought as to whether there are other metering solutions or technology options that should be considered, consistent with increasing economic efficiency. Has the discussion, including the comparison of options in Appendix B, adequately considered issues related to metering solutions and other technology options?
4	3.7	In this section, a range of options for deploying metering solutions and other technology have been considered. Comment is sought as to whether there are other deployment options that should be considered. Has the discussion, including the comparison of options in Appendix C, adequately considered issues related to deployment options?

Issue no.	*Ref.*	*Issue Description*
5	4	In this section, alternative metering services arrangements are discussed. Comment is sought as to whether the current metering service arrangements are a barrier to consumers adopting economically efficient metering solutions and other technology. If so, are there any other options that should be considered in relation to the responsibility for metering services? Has the discussion, including the comparison of options provided as Appendix D, adequately considered the issues related to metering services arrangements?
6	5	In this section, alternative meter ownership options have been discussed, and the changes required to regulatory instruments to implement any change have also been discussed. Comment is sought as to whether the existing meter ownership model is a barrier to consumers switching retailers or a barrier to consumers adopting economically efficient metering solutions or other technology. Should any other options be considered in relation to meter ownership? Which party should own the meters? Has the discussion, including the comparison of options provided as Appendix E, considered adequately the issues related to meter ownership?
7	6	In this section, the following legal and regulatory issues, which may be a barrier to the adoption of economically efficient metering solutions and other technology options, have been discussed: the flexibility to vary distribution and retail tariffs; the "non reversion" policies that are applicable to interval meters; the period over which metering data is stored; the provision of access to metering data; and enforcement of unique Australian metering standards. Are these legal and regulatory issues barriers to the adoption of economically efficient metering solutions and other technology? Are there other legal and regulatory issues which need to be considered?
8	7	Comment is sought in relation to the effectiveness of the jurisdictional ring fencing arrangements in preventing anti-competitive conduct between the distribution business, retail business and metering business. Has the discussion adequately considered the issues related to ring-fencing?

Issue no.	*Ref.*	*Issue Description*
9	8	In this section, the options for improving the efficiency of the metrology procedures by increasing the extent to which the jurisdictional metrology procedures are consistent have been discussed. Comment is sought in relation to the whether there should be greater consistency across the jurisdictional metrology procedures for metering installation types 5, 6 and 7. What are the benefits realisable from greater national consistency across the metrology procedures? Should responsibility for some or all of the metrology procedures be transferred from the jurisdictional regulators to NEMMCO? Are there any additional options for developing a greater level of national consistency across the metrology procedures for metering installation types 5, 6 and 7 that should be considered? Has the discussion, including the comparison of options in Appendix F, considered adequately the issues related to furthering consistency across the Metrology Procedures?

Contents

1 Introduction

The competition reforms of the 1990s have transformed Australia's electricity sector. These reforms included the separation of the previously integrated supply chain, introduced competition between generators for supplying electricity and allow customers the choice of retailer. The reforms have brought the network sector under access and price regulation and saw the creation of a single wholesale market for electricity known as the National Electricity Market ("NEM"). The NEM currently consists of five Australian states and territories – the Australian Capital Territory ("ACT"), New South Wales ("NSW"), Queensland, South Australia and Victoria. Tasmania intends joining the NEM following completion of an undersea connection between Tasmania and Victoria.

Reform of the electricity sector has been designed to increase the efficiency of the sector for the long-term benefit of all consumers and it is recognised that the reforms have already brought many benefits. Competitive pressures have seen increased generator efficiency and availability, and additional generation investment has occurred that seems to have been driven by market needs.

The reforms to allow customers to choose their retailer have now been introduced in most states participating in the NEM[15]. These reforms allow a customer to choose the price and service package that best meets the customer's need, from a range of retailers. The ability of this retail market to deliver a range of price arrangements allows customers to choose how to consume power to gain maximum benefit for themselves and the electricity market as a whole. Such action by customers is an element of demand side participation in the market. Demand side participation is considered to have overall market benefits as well as benefits to individual consumers.

However, it is also recognised that there are reform areas that still need to be addressed[16]. A key feature of competitive markets is the active participation of both the supply and demand sides. Without this, competition is blunted and the potential benefits of competition may not be fully realised. The recent review of the energy markets concluded that one of the reasons "there is a relatively low demand side involvement in the NEM [is that] residential consumers do not face price signals"[17]. One of the objectives of this review is to identify whether there are specific barriers to consumers receiving these price signals.

This paper is concerned with mechanisms, principally metering technologies, by which the market can provide different pricing offers to customers that provide customers with the choice to respond to the pricing signals.

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[15] Only large customers in Queensland (those consuming more than 200 MWh per annum) are able to choose their retailer.

[16] Council of Australian Governments, Energy Market Review, *Towards a Truly National and Efficient Energy Market*, p 8

[17] Council of Australian Governments, Energy Market Review, *ibid*, pp 173 – 174

1.1 Background

The National Electricity Law provides the legal basis for the NEM and the National Electricity Code ("the Code") and facilitates enforcement of the provisions of the Code. The Code contains the market rules. It sets out the objectives of the NEM, and the rights and responsibilities of market participants, the market manager (NEMMCO) and the code administrator (NECA).

Any changes proposed to the Code are forwarded by NECA to the Australian Competition and Consumer Commission ("ACCC") under Part VII of the Trade Practices Act ("TPA") for authorisation. Authorisation under Part VII of the TPA provides immunity from court action for certain types of market arrangements or conduct that would otherwise be in breach of Part IV of the TPA, where the ACCC concludes that the public benefits of the arrangements or conduct would outweigh the anti-competitive detriments of such arrangements or conduct.

Full retail competition ("FRC") was introduced into the electricity market in New South Wales and Victoria in January 2002, in South Australia in January 2003 and in the ACT in July 2003. In preparation for the introduction of FRC, amendments to the Code were submitted to the ACCC in August 2000 for authorisation. These changes are referred to as the FRC code changes, and proposed to:

- Introduce transitional metering arrangements that recognised the existing domestic metering infrastructure and accommodated the jurisdictional timeframes and policies for introducing FRC. That is, the proposed code changes allowed small consumers to transfer retailers on the basis of basic meters with profiling in addition to manually read interval meters;
- Require each jurisdiction to appoint a metrology coordinator to be responsible for the development of metrology procedures that facilitate the conversion of metering data into a format suitable for use in the current wholesale markets settlement system. The metrology procedures were a mechanism for communicating jurisdictional policy decisions relating to FRC; and
- Clarify the roles and responsibilities of the responsible person for metering.

In August 2001, the ACCC granted authorisation to changes to the Code to facilitate the introduction of FRC.

Submissions to the ACCC's draft determination had expressed concerns about the ACCC's intention to allow for both type 5 and type 6 metering installations[18]. Particularly, concern was expressed that profiling, by its very nature, is anticompetitive and acts as a barrier to entry for second tier retailers. In its final decision the ACCC acknowledged the shortcomings of a profiling based solution but considered that:

[18] see section A.1 for descriptions of these metering installations

> *"... the public benefits of allowing a low cost solution to promote customer choice, despite its lack of accuracy, outweighs any anti-competitive detriments associated with requiring customers who choose to change their retailer to have a metering installation."*[19]

However, in allowing profiling the ACCC went on to state:

> *"... the Commission is not convinced that the full benefits of competition will be delivered in the longer term without a move towards interval metering. The Commission considers that ... only interval metering, not profiling, will provide the potential for signals to encourage demand side responsiveness and innovative retail tariffs, thereby leading to more genuine retail competition."*[20]

Furthermore, the ACCC was concerned that multiple metrology procedures could act as a barrier to competition for retailers and impose additional costs on retailers, and noted that:

> *"In the longer term ... the Commission considers that the benefits of FRC will be facilitated by a single metrology procedure."*[21]

For these reasons, the ACCC imposed the condition on authorisation that the Jurisdictional Regulators must, by 31 December 2003, jointly conduct and complete a review of metering installation types 5 and 6 and of the metrology procedures (the "Review").

The Code changes that were authorised allowed each jurisdiction to develop its own metrology procedure, but imposed the condition that the Review consider the costs and benefits of a single, nationally consistent metrology procedure.

The ACCC was also concerned that:

> *... joint distribution/retail businesses may misuse their position to deter other retailers from entering the market.*[22]

The ACCC imposed a condition that the jurisdictional regulators review the effectiveness of the current ring-fencing arrangements for prescribed and other services in preventing anti-competitive conduct between the distribution businesses, its retail business and the metering businesses. This review of ring-fencing arrangements is being undertaken in conjunction with this Review.

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[19] ACCC, *Determination on Full Retail Competition and Registration of Code Participants,* August 2001, p.19.
[20] ACCC, *ibid*, p.19.
[21] ACCC, *ibid*, p.15.
[22] ACCC, *Determination on Full Retail Competition and Registration of Code Participants,* August 2001, p.24

1.2 Purpose of this Issues Paper

The purpose of this Issues Paper is to outline the issues associated with the Review. The Review deals principally with metering installations types 5 and 6 and options for developing a single nationally consistent metrology procedure. The Review must consider whether there are barriers to consumers adopting economically efficient metering solutions and other technology. Where such barriers are identified, the Review must propose recommendations to reduce such barriers. The Review will include consideration of meter ownership, technology, and effects on the wholesale and retail pricing signals and consumption decisions. Regard must be had to jurisdictional requirements in relation to new and replacement meters.

Additionally, the Review is to consider whether the current ring-fencing requirements are adequate for the proposed metering or metering data services provisions[23].

The Review will propose any changes to the Code necessary to implement the recommendations, and is to be completed by 31 December 2003.

This Issues Paper develops the issues associated with the Review and develops options for removing the barriers to economically efficient metering solutions and other technology, and for nationally consistent metrology procedures. The Issues Paper seeks comments from stakeholders and other interested parties, which will then be considered in the development of the draft report.

While this Review will make recommendations on options for addressing barriers to the adoption of economically efficient metering solutions and other technology, options for nationally consistent metrology procedures, and changes to the Code, each jurisdiction[24] will make their own decisions on those recommendations.

The jurisdictions participating in the Review are the ACT (ICRC), New South Wales (IPART), Queensland (QCA), South Australia (ESCOSA), Tasmania (OTTER)[25] and Victoria (ESC). A working group with a representative from each jurisdiction has been formed with the ESC coordinating the activity.

1.3 Review timetable

The timetable for the Review is as follows:

Activity	*Timing*

[23] National Electricity Code, clause 7.13(i)

[24] The jurisdictions that are a party to this joint review are the Victoria, New South Wales, the Australian Capital Territory, South Australia, Queensland and Tasmania (as an observer)

[25] Tasmania is a member of both NECA and NEMMCO and has a NEM entry timetable linked to the completion of Basslink by mid 2005.

Activity	*Timing*
Release Issues Paper	15 August 2003
Commencement of public consultation on Issues Paper	15 August 2003
Conduct public meeting on Issues Paper (Victoria)	Between 25 and 29 August 2003
Consultation on Issues Paper closes	12 September 2003
Consider submissions and prepare Draft Report	12 September – 24 October 2003
Release Draft Report	24 October 2003
Commencement of public consultation on Draft Report	24 October 2003
Conduct public meeting (NSW)	Between 24 October and 3 November 2003
Consultation on Draft Report closes	7 November 2003
Consider submissions and prepare Final Report	7 November – 15 December 2003
Release Final Report with consistent recommendations for variations to the Code	15 December 2003

1.4 Structure of the report

The remainder of this report is structured as follows:

- Section 2 outlines the requirements in the Code for the conduct of this review, interprets the requirements of the Code to define the relevant concepts for this review (for example, barriers), and develops the assessment criteria that will be used to assess options in the following sections;
- Section 3 discusses how the metering arrangements impact economic efficiency, provides background information on the components of the retail electricity tariff, and describes the current metering arrangements. It discusses whether profiling may be a barrier to the adoption of economically efficient metering solutions and other technology, and identifies and examines a range of metering solutions and other technology options and options for deploying economically efficient technology;
- Section 4 examines whether the current arrangements for metering services are a barrier to the adoption of an economically efficient metering solution or other technology option. A number of alternative metering service arrangements are proposed. Each of these options is discussed within the assessment framework;

- Section 5 examines whether meter ownership acts as a barrier to consumers adopting economically efficient metering solutions or other technology options, or as a barrier to end users switching retailers. Options for meter ownership are identified and discussed within the assessment framework;
- Section 6 identifies and examines whether there are other legal and regulatory barriers to the adoption of an economically efficient metering solution or other technology option, including the flexibility to vary distribution tariffs and first tier retail tariffs, "non reversion" policies for interval meters, the period metering data is stored, the provision of access to metering data, and the enforcement of unique Australian metering standards;
- Section 7 examines the existing ring-fencing arrangements in each of the jurisdictions to identify whether they prevent anti-competitive conduct between the distribution businesses, its retail business and the metering businesses; and
- Section 8 identifies and examines the options for ensuring national consistency in the metrology procedures.

1.5 Acknowledgement

This report has been prepared by KPMG Policy and Regulatory Advisory Services in consultation with the jurisdictional regulators.

2 Developing the assessment framework

An important element of the Review is to develop a framework that will be used to assess whether barriers exist to customers adopting economically efficient metering solutions or other economically efficient technology. The framework will also be used to assess any options that are identified to remove these barriers.

A theoretical approach has been adopted in developing the assessment framework, by reference, where possible, to the Code requirements that are relevant to this Review. Where the Code does not provide guidance as to the assessment framework, further economic concepts are introduced and discussed in order that the assessment framework is complete. The framework itself forms part of the issues for consultation.

A more practical approach has been adopted in the application of this assessment framework in subsequent sections of this Issues Paper.

2.1 Code requirements relevant to this Review

The Code requires the jurisdictional regulators to conduct the Review. It also provides some guidance on the way in which the Review is to be conducted and the issues to address.

2.1.1 Code requirements specific to this Review

Clause 7.13(f) of the Code requires a Joint Jurisdictional Review of metrology procedures to be undertaken. It states:

> *The Jurisdictional Regulators must, by 31 December 2003, jointly conduct and complete a review of metering installations types 5 and 6 and the metrology procedures that have been implemented in the participating jurisdictions.*

Clause 7.13(g) of the Code sets out some issues that must be taken into account in undertaking the review. It states:

> *The review conducted in accordance with clause 7.13(f) must:*
>
> *(1) in relation to metering installations types 5 and 6:*
>
> *(i) consider whether barriers exist to consumers adopting economically efficient metering solutions or other economically efficient technology and examine whether meter ownership acts as a barrier to end users switching retailers;*
>
> *(ii) if it is determined, in accordance with clause 7.13(g)(1)(i), that barriers exist, the review must make recommendations in relation to reducing those barriers, in order to promote the adoption of economically efficient solutions, for example, recommendations regarding the accelerated replacement of type 6 meters with type 5 meters and/or the sunsetting of load profiling;*

(iii) include in the economic analysis the cost to consumers of any stranded assets;

(iv) take into account any jurisdictional requirements in place at the time of the review in relation to new and replacement meters; and

(v) consider the effect of implementing a metering solution on consumption decisions made at the wholesale level and how this filters through to retail pricing.

(2) consider options for developing a single nationally consistent metrology procedure for each of metering installation types 5, 6 and 7;

(3) propose to NECA any changes to the Code that are necessary to implement the recommendations made by the review; and

(4) specify a date for a further review to be conducted.

Additionally, clause 7.13(i) of the Code states that:

The Jurisdictional Regulators must, by 31 December 2002, review the effectiveness of the ring-fencing arrangements for prescribed services and other services in their respective jurisdictions:

(1) in preventing anti-competitive conduct;

(2) in providing transparency; and

(3) in providing confidence in the integrity of the competitive market arrangements between the Distribution Network Service Providers, Customers, and Metering Providers.

2.1.2 Other relevant clauses of the Code

A number of other clauses of the Code are also relevant to this Review. The most important of these are clauses 7.3.1(bc), 1.3(b) and 1.4(b).

Clause 7.3.1(bc) of the Code outlines the principles that a Metrology Coordinator (who is the same party as the Jurisdictional Regulator for metering installation types 5 and 6) must have regard to in developing a metrology procedure. Clause 7.3.1(bc) states that:

Subject to clause 7.3.1(n), in the preparation of a metrology procedure, a Metrology Coordinator must have regard to:

(1) the promotion of an efficient market;

(2) the avoidance of unreasonable discrimination between Market Participants;

(3) minimisation of barriers to entry for competing retailers;

(4) providing metrology procedures which are technically sound and economically efficient; and

(5) the Code consultation procedures where reasonably practical

and to the extent of any conflict between the application of these objectives to a particular metrology procedure, the Metrology Coordinator may determine the manner in which they can be best reconciled or which of them should prevail.

Clause 1.3(b) is a "protected provision" of the Code that sets out the broad objectives of the market. It states that:

The objectives of the national electricity market (called "market objectives") are as follows:

(1) the market should be competitive;

(2) customers should be able to choose which supplier (including generators and retailers) they will trade with;

(3) any person wishing to do so should be able to gain access to the interconnected transmission and distribution network;

(4) a person wishing to enter the market should not be treated more favourably or less favourably than if that person were already participating in the market;

(5) a particular energy source or technology should not be treated more favourably or less favourably than another energy source or technology; and

(6) the provisions regulating trading of electricity in the market should not treat intrastate trading more favourably or less favourably than interstate trading of electricity.

Clause 1.4(b) is a "protected provision" of the Code that sets out the broad objectives of the Code. The relevant objectives are:

(1) to provide a regime of "light-handed" regulation of the market to achieve the market objectives;

(2) to provide for a set of market-oriented rules authorised by the ACCC governing market operations, power system security, network connection and access and network services pricing;…

(6) in particular, to provide for the following in respect of technical and market operations;…

(iii) detailed operational requirements, including power system operations and power systems security, emergency operations, and metering and maintenance scheduling;…

2.2 Defining the relevant concepts

In this section we outline and discuss the requirements of the Code, as provided in the previous section, with respect to this Review, noting that the Code does not provide complete guidance on how to conduct this Review.

The Jurisdictional Regulators, in conducting this Review, need to ensure that this Review takes into account the views of customers and stakeholders. In addition, in applying the

recommendations of this Review, the Jurisdictional Regulators have their own specific statutory objectives that they are obliged to take into account in undertaking their role. It should be noted, however, that some of the policy decisions arising from this Review are to be made by the government, rather than the regulator, in some of the jurisdictions.

One of the key tasks of this Review is to determine whether there are any barriers that are preventing customers from adopting economically efficient metering solutions or other economically efficient technology.

The Code does not define what it means by the term "barriers", although it does specify some examples of what might constitute barriers (i.e. most notably ownership, the types of meters that customers are permitted to use and profiling). Nor does it define what it means by the term "economically efficient". It is therefore necessary to discuss and ultimately define and interpret these terms in the context of this Review.

Some assistance in defining these terms is provided by the high level objectives outlined in clauses 1.3(b) and 1.4(b) of the Code. These then provide the context for the more specific objectives outlined in clause 7.3.1(bc), to which this Review must have regard.

NEMMCO recently provided its interpretation of these high level objectives. It states that:

> *"The market objectives reflect a presumption that competition (as opposed to administered solutions) is more likely to deliver efficient outcomes. This presumption is consistent with the principles of the COAG Agreements and National Competition Policy that apply to the electricity sector. The market objectives also clearly emphasise the goal of creating a competitive – and hence efficient – market."*[26]

The NEMMCO interpretation goes on to state that:

> *"The Code Objectives and Market Objectives together strongly suggest that market-based mechanisms rather than regulatory mechanisms are preferred. The reference to a regime of 'light-handed' regulation to achieve the market objectives implies arrangements that involve minimal regulatory intervention in the processes that lead to the formation of the market clearing price. Such a requirement is consistent with the goal of maximising efficiency."*[27]

It should be noted that maximising efficiency is not desired for its own sake. Rather it is desirable because improving efficiency is typically consistent with benefiting consumers. It is generally assumed that in an efficient electricity market, improvements in efficiency are consistent with the consumers' interests, but this does not necessarily imply that this will be at the lowest cost to each and every consumer.

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[26] NEMMCO, *Assessing the efficiency impact of proposed changes to market arrangements Guideline*, 27 August 2002, p17.

[27] Ibid., page 18.

NEMMCO's report also goes into some detail to describe the conditions that are thought to be most consistent with these objectives. NEMMCO's report would appear to be consistent with standard interpretations of economic theory, which is also applied by many regulators.[28]

NEMMCO's interpretation of the Code would appear to be relevant to the interpretation of clause 7.3.1(bc) – the promotion of an efficient market. More importantly, it would also appear to be relevant to defining the terms "barriers" and "economically efficient".

2.2.1 Defining "barriers"

The ACCC does not define what is meant by barriers in its Determination Paper on the FRC Code changes.[29] Like the Code it does, however, provide examples of what may be barriers (eg. meter ownership). Similarly, the ESC does not define what is meant by barriers in its Position Paper on the costs and benefits of installing interval meters.[30] The ESC does, however, provide examples of what it perceives to be holding back the widespread market deployment of interval metering, as a form of economically efficient metering solution, in the short term. These are: a lack of distributor and customer incentives, the nature of the relationship between retailers and customers, cross subsidies, and externalities.

Economic theory does not provide clear guidance on what might constitute market *barriers*.[31] Instead, economic theory typically only recognises market *failure*. Economic theory suggests that there are only two conditions under which markets fail to maximise efficiency: public goods and externalities.[32]

Consequently, economic theory also suggests that these are the only justifications for market intervention. In other words, unless a market failure exists, decisions made by consumers will lead to optimal outcomes from the market perspective. This is consistent with the views of NEMMCO as outlined above. There is therefore no distinction, in economic theory, between the long run interests of consumers and the unfettered operation of competitive markets (as implied by NEMMCO above), unless there is a market failure of one of the two types identified.

There is therefore no economic case for market intervention to address market *barriers*, unless they are a function of, or are likely to lead to, market failure.

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[28] ACCC, *Statement of Principles for the Regulation of Transmission Revenues: Draft*, 27 May 1999.

[29] ACCC, Determination Paper: *"Applications for Authorisation Amendments to the National Electricity Code Full Retail Competition and Registration of Code Participants",* 1 August 2001.

[30] ESC, Position Paper: *"Installing Interval Meters for Electricity Customers – Costs and Benefits"*, November 2002. See page 24 in particular.

[31] See for example Katz , M., Rosen, H., Microeconomics, Richard D Irwin Inc, 1991. Where barriers are discussed it is within the context of barriers to entry.

[32] Externalities arise where the costs of consuming a good are not reflected in this price. It should also be noted that economic theory has nothing to say about equity, which is a common justification provided for government intervention in markets.

In practice, however, the situation is unclear for the following reasons:

- While market failure is a necessary condition for market intervention to remove barriers to the adoption of economically efficient metering solutions or other technology, it might not be sufficient. Intervention can only be justified where the benefits of the intervention outweigh the costs, which effectively raises the bar for justifying market intervention.
- In some markets price regulation can be justified in certain circumstances of natural monopoly.[33]
- The economic theory outlined above effectively assumes that markets operate in a vacuum. In practice, virtually all markets operate within a context of regulation. Regulation creates barriers that restrict the operation of an efficient market, often in unforeseen ways. Barriers created by regulation are often referred to as "institutional" barriers.
- The retail electricity market, in particular, operates within a highly regulated context. This is because the market did not evolve as a result of changing consumer needs or the advent of new technology (although this has clearly helped). Rather the retail electricity market was "created" by removing restrictions on competition. The retail electricity market also exists within a highly regulated context because of the sheer complexity of creating a functioning market in electricity and the ongoing need for consumer protection, particularly for small consumers, for the provision of an essential service.
- Institutional barriers that restrict the operation of competitive markets might provide a justification for policy action in certain circumstances.
- A focus on institutional barriers is consistent with those identified in the Code and highlighted by the ACCC as potential barriers (eg. rules on meter ownership).[34] However, it leads to a number of questions:
  - If the barriers are a function of the institutional framework, why is this the case?
  - What are the other objectives of the institutional framework?
  - Are the barriers a by-product of an institutional framework that has been developed with insufficient regard paid to the costs of that framework, and could be altered at little or no cost to other policy objectives?
  - Or, are the barriers a function of a more complex trade-off between competing policy objectives (eg. practicality, a timing issue given the task of introducing retail competition, equity)?

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[33] Natural monopoly occurs in situations where the costs of production exhibit falling long run average costs. Public goods are products whose production costs are indivisible and whose consumption is difficult to charge for. Other forms of regulatory intervention may be required where firms have substantial market power, for whatever reason.

[34] It is less consistent with the issues identified by the ESC (excepting cross subsidies and externalities). These issues appear to go beyond institutional barriers. Rather they address the reasons why the benefits of market intervention to roll-out interval meters might exceed the costs.

- If it is the latter, what is the best method of addressing these barriers? Developing other policy instruments to address these "secondary" policy issues?

An examination of these issues might provide a case for lowering the bar for market intervention, but the costs and benefits of that intervention need to be considered in these circumstances.

- It is also worth noting that constraints on the development of a market that appear to be attributable to institutional barriers might also be a function of the inherent characteristics of that market (eg. high transaction costs). For example, the "costs" of attaining economic efficiency from the customers' perspective might be different to those assumed in some economic analyses. Moreover, the case for intervening to reduce transaction costs needs to be made clearly because transaction costs arise in all markets.[35]

For the purposes of this report, it is assumed that the barriers identified in the Code refer to those that might be associated with any rules that inhibit the consumers' incentive to adopt economically efficient metering solutions or other economically efficient technology. In other words, barriers are any rules that inhibit the consumers' ability to make decisions in regard to their electricity use, or distort the information on which those decisions would be based.

These rules or potential barriers are identified in section 2.4.

2.2.2 Defining "economically efficient"

The Code, consistent with economic theory, creates a strong presumption that the "economically efficient" outcome will be achieved by allowing customers to make choices in regard to:

- Their electricity retailer;
- The way in which they are metered; and
- Their electricity consumption.

This is consistent with the framework for "economic efficiency" outlined by NEMMCO.

These choices are not being provided for their own sake. Rather they are being provided in the expectation that the competitive process will lead to improvements in the efficiency with which services are provided and electricity is priced. More importantly, these choices are being provided because improvements in the efficiency with which services are provided and electricity is priced, are expected to benefit consumers[36].

[35] But it is possible that they may be "unduly" high in markets in transition, and could be lowered cost effectively by policy action.

[36] Although some consumers may not see improvements in the way that electricity is priced because they may choose not to change their consumption of electricity.

The only caveat to the benefits of consumers making these decisions is where barriers are distorting the choices consumers make. In other words, where barriers are creating a distinction between what represents "economically efficient" from the consumers' perspective and from the electricity sector's perspective.

These improvements in efficiency can be expected to be of three main types:

- Productive efficiency, which is linked to the ratio of outputs to inputs, that is, how best to produce. Improvements in productive efficiency might be expected to emerge primarily in reductions in the size of the retail margins earned by retailers. Productive efficiency improvements might also result from improved energy purchasing practices by retailers;
- Allocative efficiency, which involves deciding the most value adding use of limited inputs, that is, which outputs to produce. Improvements in allocative efficiency might be expected to emerge from the development of more cost-reflective pricing, and the impact this may have over time on the total cost of delivering electricity, freeing up resources to devote to the provision (or consumption) of other services. In the electricity industry the benefits associated with allocative efficiency are often referred to as demand management or demand side participation; and
- Dynamic efficiency, is concerned with the continuous achievement of productive and allocative efficiencies over time. For example, this might be through the range of services provided that customers might value (for example, methods of bill payment).

Economically efficient metering solutions and other technology can therefore be expected to facilitate the achievement of the three types of efficiency outlined above. The problem with these definitions of efficiency is that they provide little practical guidance on what outcomes one might expect to observe in a market. They do, however, provide some guidance on the sorts of activity that a market would exhibit.

For the purposes of this report, it is assumed that an economically efficient metering solution or other technology is one that will facilitate the achievement of productive, allocative and dynamic efficiency, which overall achieves economic efficiency. Consumers may choose to adopt economically efficient metering solutions and other technology, provided that those decisions can be made on the basis of information that is not distorted by any barriers. The objective of addressing any barriers to economic efficiency is therefore to ensure that customers are in a position to make decisions in relation to their choice of retailer and retail services (including metering) that are broadly consistent with the costs and benefits from the electricity sector's perspective.

2.3 The assessment criteria

The preceding discussion enables the establishment of criteria to identify any barriers that exist to the uptake of economically efficient metering solutions and other technology options, and to assess the options for removal of those barriers. The barriers are assessed from three perspectives: economic efficiency, practicality and equity.

- *Economic efficiency* – potential barriers are assessed in terms of their economic costs and benefits by reference to the three economic tests outlined above (i.e. productive, allocative and dynamic efficiency). Identifying the competitive activity that is likely to occur in the absence of a barrier is how its economic cost can be assessed. For example, the removal of a barrier to economically efficient metering solutions and other technology options might have the benefit of allowing more cost reflective price signals to be sent to customers and thus encourage more demand side management. Alternatively, by examining why a barrier was introduced in the first place, it might be possible to identify its benefits. For example, allowing more cost reflective prices will involve some costs, which might outweigh the benefits of providing those price signals in the first place.

  This involves addressing three of the key issues that must be covered in the Review:

  - The promotion of an efficient market (clause 7.3.1(bc)(1));
  - The effect of implementing a metering solution on consumption decisions made at the wholesale level and how this may impact retail pricing (clause 7.13(g)(v)); and
  - The minimisation of barriers to entry for competing retailers (clause 7.3.1(bc)(3)).

- *Practicality* - the costs and benefits of removing any barriers will also be assessed from a practical perspective. This involves addressing two of the key issues that must be covered in the review:

  - The jurisdictional requirements in place at the time of the review in relation to new and replacement meters (clause 7.13(g)(iv)); and
  - Providing metrology procedures that are technically sound and economically efficient (clause 7.3.1(bc)(4)).

- *Equity* - the incidence on particular customers and Market Participants of the costs and benefits of any barriers is assessed. In other words, situations where the costs and benefits of particular barriers would appear to be having a material impact on particular groups are identified. This involves addressing two of the key issues that must be covered in the review:

  - The cost to consumers of any stranded assets (clause 7.13(g)(iii)); and
  - The avoidance of unreasonable discrimination between Market Participants (clause 7.3.1(bc)(2)).

  Equity considerations will be of particular concern to the regulator, consistent with their specific objectives to protect consumers and to ensure they benefit from increased competition and efficiency.

This approach is considered to be appropriate for addressing barriers, particularly those that are most likely to be an issue, given the development of the retail electricity market. In particular, this approach applies to potential barriers that may be a function of policy decisions made with a number of (potentially conflicting) objectives in mind. This is

because it provides a framework for assessing the barriers within the context of those policy objectives.

2.4 Possible barriers to the adoption of economically efficient metering solutions and other technology

The institutional arrangements that are possible barriers to the adoption of economically efficient metering solutions and other technology, which are considered in this Issues Paper, are:

- Metering arrangements – small consumers may currently transfer retailers on the basis of interval metering or non-interval metering (with profiling for wholesale market settlement, as discussed in sections 3.4 and 3.5. These current metering arrangements may be a barrier to the adoption of economically efficient metering solutions and other technology if it distorts the price signals to which consumers would otherwise be exposed. The installation of alternative forms of metering and/or other technology may therefore be an **enabler** of cost reflective tariffs, as discussed in sections 3.6 and 3.7. However the technology may not be sufficient in isolation to realise the full benefits of economic efficiency;
- Metering services – the distributors are currently responsible for metering services to small consumers. These arrangements may be a barrier to adopting economically efficient metering solutions and other technology as customers and retailers are generally constrained to the distributor's standard offering, as discussed in section 4;
- Meter ownership – the distributors currently own the meters for first tier customers and small second tier customers. Similarly, this may act as a barrier to the adoption of economically efficient metering solutions and other technology as customers and retailers are generally constrained to the distributor's standard meter, as discussed in section 5;
- Other legal and regulatory issues, including:
  - Distribution and retail tariffs – certain metering solutions facilitate more cost reflective distribution tariffs. Constraints on the setting of more cost reflective distribution and retail tariffs, might therefore be a barrier to the adoption of economically efficient metering solutions and other technology, as discussed in section 6.1; and
  - Interval meter "non-reversion" policies – there are currently regulatory provisions such that interval meters cannot be replaced by accumulation meters. In some jurisdictions, interval meters must be read as interval meters. As there is a higher cost associated with reading interval meters compared to accumulation meters, these provisions may act as a barrier to the more wide-spread installation of interval meters by distributors, as discussed in section 6.2.

2.5 Approach to identifying and examining barriers

This Issues Paper considers each of the barriers identified, separately as it would be too cumbersome to consider them simultaneously. While each of these elements is considered separately in the first instance, it is recognised that there are interdependencies between the various issues.

Issue No. 1

In this section an assessment framework has been developed for identifying and discussing barriers to the adoption of economically efficient metering solutions and other technology.

Comment is sought in relation to this assessment framework. Is the assessment framework complete? Is the interpretation of economic efficiency appropriate for this Review? Are there any additional assessment criteria that should be considered? Considering the interrelationship of the different concepts, is the approach to assessing the issues appropriate?

3 Metering and other technology and the assessment framework

In this section, the impact that metering solutions and other technology options have on economic efficiency, specifically allocative efficiency, is first discussed. The components of the retail electricity tariff are also discussed as this provides an understanding of the metering data that is required if tariffs are to be cost reflective. We then discuss whether the current metering arrangements in each of the jurisdictions may be a barrier to the adoption by consumers of economically efficient metering solutions and other technology. This section also identifies alternative options for metering and other technology and discusses these in the context of the assessment framework developed in section 2. Options for deploying these alternative technologies are also identified and discussed in the context of the assessment framework.

3.1 How do metering solutions and other technology impact economic efficiency?

The potential benefits of allocative efficiency via more cost reflective pricing have been recognised by a variety of policy makers and Jurisdictional Regulators. Some examples are provided below. While the role of interval metering in delivering these benefits is also recognised, in many cases, a cost benefit analysis has not been undertaken.

- The ACCC *"is not convinced that the full benefits of competition will be delivered in the longer term without a move toward interval metering."*[37] The ACCC has gone further arguing that "*in electricity the most urgent need is to develop greater demand-side responsiveness. That is, extreme inelasticity of demand simultaneously make wholesale prices particularly volatile and enables generators to wield strong market power, especially during times of tight supply and demand."*[38]
- IPART has argued, *"it is the Tribunal's strong view that there is significant untapped potential for efficient demand management."*[39] It goes on to state, *"better pricing is critical. The competitive wholesale market is sending stronger price signals, but half the market do not see it because of the absence of the necessary metering for residential and small business users."*
- ESCOSA *"believes that the implementation of demand management initiatives will be facilitated by having a transparent process where end users are the focal point, and where consumers have adequate information to assist them in making demand management decisions and appropriate incentives to do so. In such an environment,*

[37] ACCC, Determination Paper: *"Applications for Authorisation Amendments to the National Electricity Code Full Retail Competition and Registration of Code Participants",* 1 August 2001, page 19.

[38] Chairman of the ACCC, Speech to Inaugural Conference of Energy Users' Association of Australia, 19 November 2001, page 20.

[39] IPART, *Inquiry into the Role of Demand Management and Other Options in the Provision of Energy Services*, October 2002, foreword

demand management and distributed generation options can assist network owners and retailers by providing alternative solutions that are economically attractive. Better pricing signals are critical in facilitating demand management initiatives/practices by small consumers."[40]

- The ESC has argued that an accelerated roll out of interval meters is justified because of the demand management efficiency gains that would be achieved. It argues *"these demand management efficiency gains arise from customers responding to interval meter based price signals, primarily at the time of system peak in summer."*[41]
- The report from the Council of Australian Government's ("COAG") energy market review ("the Parer Review") also addressed the issue that customers with the most 'peaky' demand, residential consumers, face no price signals regarding their use of electricity, and recommended that "*the installation of interval meters should be mandated for all consumers with the installation program to be achieved over the next 5 to 10 years*".[42]
- Recently, 11 eminent US energy experts submitted an open letter to Public Utilities Fortnightly calling for more real-time pricing. *"We write to express our strong support for dynamic pricing of electricity to retail customers. An important missing ingredient in all wholesale electricity markets in the United States is active demand side participation in the price setting process. Dynamic pricing at the retail level provides retail customers with the incentive and ability to make efficient consumption and risk management decisions reflecting their own individual preferences. It is the least cost way to achieve active demand side participation in the wholesale market."*[43] They conclude: *"We strongly urge state public utility commissions to support the widespread adoption of hourly metering technology and dynamic pricing plans."*

Allocative efficiencies arise by providing cost reflective price signals to consumers. Consumers would then be in a position to make appropriate decisions about their electricity consumption and decide whether to change, or to not change, their behaviour. Accordingly, consumers may choose to change their consumption pattern so they do not pay more under a cost reflective tariff regime, or they may choose to pay the resultant cost reflective tariffs.

However, in practice, more cost reflective tariffs to consumers are predicated on the following assumptions:

- That the retailers will offer more cost reflective tariffs to customers in a competitive retail market;

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[40] ESCOSA, *Position Paper: Demand Management for Distributors*, January 2003, page 1-2

[41] ESC, *Position Paper, Installing Interval Meters for Electricity Customers – Costs and Benefits*, November 2002, page 7.

[42] The Parer Committee, *Towards a Truly National and Efficient Energy Market*, 2002, p 54

[43] An Open Letter from 11 Energy Experts, *"The Time Has Come for Real Time Pricing"*, Public Utilities Fortnightly, 1 July 2003, page 28. They are arguing that these programs should be introduced for larger users immediately and for smaller users as soon as it becomes economic.

- That customers will choose the more cost reflective offers made by retailers; and
- That customers will make informed decisions to either change their consumption pattern, or to pay the resultant cost reflective tariffs.

This uncertainty is discussed further in section 3.3.

3.2 How do these allocative efficiencies arise?

The electricity system needs to be designed and built to meet the forecast peak demand. Allocative efficiency assumes that customers are exposed to cost reflective tariffs, which allows for the higher cost at peak times to meet new plant requirements. If some of these customers change their electricity consumption, the peak demand may be managed by:

- Reducing the demand during periods of peak demand; and / or
- Shifting some demand from peak periods to off-peak periods.

If customers choose to reduce and/or shift their demand for electricity, then the following benefits could result:

- Improving the efficiency of existing generation plant utilisation and potentially deferring new generation capacity; and
- Improving the utilisation of existing network infrastructure and deferring augmentation of the network.

These allocative efficiencies could flow to all consumers, assuming that they are passed through to consumers in the retail electricity tariffs.

The allocative efficiencies that may be realisable will vary by jurisdiction based on the actual load characteristics. The load duration curves, which show these characteristics, are summarised in Table 1 below.

Table 1: Characteristics of the load duration curve for each jurisdiction

Jurisdiction	Characteristics of load duration curve
NSW/ACT	Transitioning from winter peak (evening) to summer peak with growth in air conditioning.
South Australia	High summer needle peak, characterised by days of high temperature. Daily load curve reasonably flat.
Queensland	Small summer needle peak, characterised by days of high temperature following a run of days of high temperature.

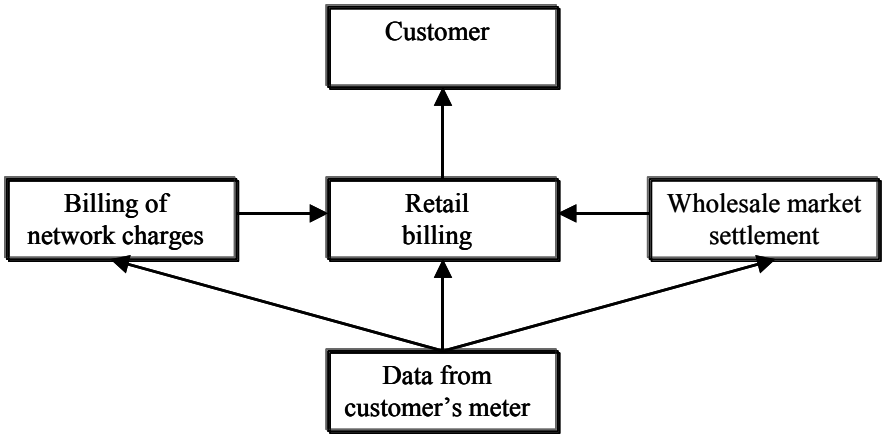
Jurisdiction	Characteristics of load duration curve
Tasmania	Small winter needle peak in the morning and evening. Reasonable variability in the daily load curve.
Victoria	Moderate summer needle peak, characterised by days of high temperature.

3.3 Retail electricity tariffs

Customer metering has assumed an enhanced role in the competitive market. As illustrated in Figure 1, the metering data obtained from a meter is now used for a number of different purposes, including:

- To settle the wholesale energy market. The metrology procedures govern the metering for the purposes of wholesale market settlement, as discussed in section 8;
- To enable the distributor to invoice the retailer for network charges; and
- To enable the retailer to bill the customer based on the retail electricity tariff.

The metering data must accommodate the needs of each of these different purposes, which are discussed in further detail in this section.



Note: Diagram may not apply to large customers that are settled directly in the wholesale market or that have separate contracts with the distributor for network charges and with the retailer for energy charges

Figure 1: Uses of data from customer's meter

If retailers choose to offer cost reflective tariffs to customers, then the extent to which each component of the retail electricity tariff offered may reflect the underlying costs, needs to be

considered, particularly with respect to the metering needs. The components of the retail electricity tariffs are:

- Energy charges – which account for approximately 40 - 50% of the retail tariff;
- Network charges, including distribution use of system charges ("DUoS charges") and transmission use of system charges ("TUoS charges") – which account for approximately 40 - 50% of the retail tariff;
- Retailer costs, for example billing, call centre costs and their margin; and
- Other costs, for example NEMMCO participant fees.

These components are discussed in the following sections.

3.3.1 Energy charges

The NEM operates as a wholesale electricity pool from which retailers purchase electricity for resale to customers. Retailers may also have contracts directly with generators. The degree to which retailers contract directly with generators relative to the extent to which they purchase electricity through the wholesale market is dependent on the risk profile of that retailer.

The wholesale price of energy is set half-hourly (the spot price) for each region in the NEM. NEMMCO needs to know how much electricity is consumed by the customers of each retailer in the NEM during each half-hour trading interval to enable financial settlement of the wholesale market.

The wholesale market is settled weekly. At the conclusion of each trading week, NEMMCO calculates the value of energy purchased by each retailer by calculating the energy consumed by its customers each half hour and multiplying the energy consumption by the cost of energy for that half hour, for each of the half hour periods in the week. NEMMCO then bills the retailer, who pays for the energy.

To avoid the need to meter each customer in the NEM on a half-hourly basis, settlement occurs via a process known as differencing, where the load of customers that have NEM standard meters (mainly those that have changed retailer from their original franchise or local retailer) is subtracted from the total load metered at the bulk supply level. The residual load remaining is taken to represent the consumption of the customers of the local retailer. In this way, each retailer is held to account, at the wholesale level, for the energy consumed by each of its customers during each half-hourly trading interval. However, it is the local retailer that bears the residual risks associated with settlement by differencing.

This process requires the consumption of all customers that choose an alternative retailer to be determined for every half-hour period or interval. This half hourly data may be provided from interval meters or by using profiling, where non interval meters are installed.

3.3.2 Network charges

The network tariffs (DUoS and TUoS) recover:

- The costs of operating and maintaining the network;
- A return of assets; and
- A return on assets.

Cost reflective network tariffs will encourage more efficient use of the network. These tariffs would require:

- Time-based pricing signals, that is, network tariffs would be higher during times of high demand and lower during times of low demand. These tariffs would encourage consumers to use the network in an optimal manner, by encouraging usage during times of low demand and discouraging use during times of high demand. However to do so requires metering that facilitates the capture of the necessary data; and
- Locational-based pricing signals. The major cost drivers of the network, such as customer density, the line length to serve the customer, vegetation control, storm activity etc, are all dependent on the location of the customer. Locational signals would ensure that development occurs where it is most appropriate. The provision of locational-based pricing signals does not require time-based metering data.

3.3.3 Retailer and other costs

The retailer and other costs are a relatively small proportion of the retail tariff. The retailer and other costs are primarily costs associated with serving the customer, for example, billing and revenue collection, the customer call centre, and sales and marketing. These costs are largely independent of when electricity is consumed and therefore do not drive the need for complex metering or other technology.

3.3.4 Retail tariff

In practice, the retail electricity tariffs offered to customers are not necessarily dependent on the type of metering installed. If an accumulation meter is installed, only a flat rate can be used. However, if there is an interval meter is installed, the retail tariff may be set based on a flat rate, time of use rates or half hourly rates. The retailer will determine the most appropriate tariff for that consumer based on a number of factors, including the retailer's marketing strategy, the profile of that consumer, the risk of that consumer to the retailer, the value of that consumer to the retailer, and the ability of the meter to allocate energy to defined time periods.

ESCOSA recently commissioned a report by Energetics[44] to determine the types of tariff structures that are being offered to consumers in the competitive Australian market. Despite the availability of half hourly data for larger customers, Energetics concluded that:

> *"… most customers and retailers prefer simple two or three part structures…"*[45]

Studies in the US have indicated, "consumers prefer fixed rates to time-of-use rates and time-of-use rates to hourly rates. However these studies did not explicitly separate the impact of "inertia" or the *status quo*, from a real preference for fixed rates."[46] Experience with more cost reflective tariffs offered by Puget Sound Energy indicates that, "under the right circumstances, residential customers are quite willing to participate on a price-responsive demand rate and change their behaviour in response to price signals"[47].

There appears to be some uncertainty as to whether retailers would offer cost reflective tariffs, even if the appropriate metering was installed, and whether consumers would accept these offers. If so, many of the assumed benefits from introducing such metering or other technology may not eventuate.

3.4 Current arrangements for metering and other technology, and the assessment framework

The current jurisdictional arrangements for metering and other technology are provided in Appendix A. In summary, the arrangements in each jurisdiction where FRC has commenced are as follows:

- Large second tier customers must have an interval meter installed;
- Small second tier customers may choose to install an interval meter or a non interval meter, to which a profile is applied to obtain half hourly data for wholesale market settlement; and
- First tier customers generally have accumulation meters installed, but have the option to install other types of meters. That is, there is currently a "market based" approach to consumers adopting other types of meters and technology.

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[44] Report for the Essential Services Commission of South Australia, Energetics, *Electricity Pricing Structures for Customers with Interval Meters*, March 2003

[45] ibid, p. 2

[46] Lisa Wood, *The New Vanilla: Why Making Time-of-Use the default rate for Residential Customers Makes Sense* in Fortnightly's Energy Customer Management, July/August 2002. The success of the Puget Sound Energy time of use tariff was dependent on the differential between the peak and off peak tariffs. The program was abandoned when an administration fee was charged to consumers and the differential between peak and off-peak tariffs was reduced, which diminished the benefits of the program to consumers.

[47] op cit

Prior to the commencement of FRC in the ACT, NSW, South Australia and Victoria, the issue of whether consumers should be able to transfer retailers on the basis of profiling was considered.

There was concern that if small customers were required to install interval meters when they transferred retailers, to provide metered half hourly data for wholesale settlement, then this would have been a barrier to customers switching retailers, as had occurred in other markets. Alternatively interval meters could have been installed for all customers prior to FRC commencing. By doing so, all customers would have had metered half hourly data for wholesale settlement, and thus the installation of interval meters would not have been a barrier to customers switching retailers. However, the costs of doing so were substantial, and the logistics of such a roll out would not have allowed FRC to commence in accordance with the jurisdictional timeframes.

Profiling was therefore introduced at that time as an alternative to interval metering, for settling the wholesale market for small consumers. Profiling provides the data necessary to perform wholesale settlement for each half-hour trading interval without requiring existing meters to be replaced with interval meters. Profiling therefore provided a potential opportunity to capture the productive efficiency improvements of competition (that is, some of the benefits), without imposing the costs associated with interval meters, and without the need to roll-out interval meters prior to competition commencing. That is, profiling provided a practical and cost effective alternative to allow competition to commence.

However, the benefits available under a simple profiling solution alone are limited to the productive efficiency benefits gained from competitive pressure on retail and wholesale costs and prices that may lead to reduced prices to all customers. Allocative efficiency gains are unlikely to be realised under a simple profiling solution because a consumer's consumption profile is unknown and therefore consumers cannot be charged on a cost reflective basis.[48]

While there is currently no regulatory barrier to customers or retailers requesting the installation of meters or other technology that is different to the distributor's standard offering, at their cost, distributors prefer to supply meters from their standard range.

3.5 Current metering arrangements and the assessment framework

Retail competition was introduced to achieve the benefits that competitive markets provide. One of the key benefits competitive markets provide is cost reflective pricing (or allocative efficiency).[49]

[48] The option of more complex profiling solutions is discussed further in section 3.6.

[49] Markets will do this within the constraints of customers' willingness to receive more cost reflective pricing. In other words, where the costs of providing more cost reflective pricing (eg. the transaction costs it imposes on the customers and the provider) exceed the benefits, "cross subsidies" or less than perfectly cost reflective prices will be tolerated.

However, the introduction of profiling allowed most customers, and the respective market participants, to receive "smeared" price signals, thus avoiding direct market price signals. Indeed, profiling provides those customers who benefit the most from receiving the "smeared" costs of the profile, with the mechanism to avoid being exposed to cost reflective prices. Typically, competitive markets do not provide such an "opt out" option.[50]

It could be argued that this opportunity to "opt out" of the market is not inefficient. This is because profiling encourages customers with a comparatively flat load profile to use an interval meter, merely to avoid paying against the more expensive average profile. Indeed, in principle, as flatter load profile customers move off profiling, the profile becomes more reflective of those customers who have no price incentive to "opt out" of profiling. However, the customers remaining on the profile are likely to be a combination of high peak users who have no incentive to install an interval meter and consumers whose consumption is too low to justify an interval meter[51]. That is, over time, there is likely to be a clear dichotomy between groups of consumers remaining on the profile.

An important consideration when examining barriers is whether alternative metering solutions and other technology options would lead to more efficient outcomes than would result from the current metering arrangements.

The energy prices paid by large users with interval meters typically reflect their measured profile[52]. Amongst smaller users, the likelihood of price differentiation between individual customers, even with interval meters installed, is less likely. It is more likely that, with interval meters installed, groups of consumers can be differentiated based on the average characteristics for that group. And hence, there may be efficient price differentiation between these groups of consumers. For example, there are other consumer markets where such price differentiation between groups of consumers appears to be occurring (eg. in telecommunications and banking).

It might be the case that non-interval meters (by protecting customers with a high cost load) distort the retailers' incentive to introduce these more cost reflective tariffs because it restricts their ability to provide any differentiation of tariffs to different groups of consumers.

A further consideration in achieving economic outcomes is the need for consumers to see materially different cost reflective tariffs when they have interval meters.

The current metering arrangements may therefore create a barrier to all consumers, or to groups of consumers, adopting metering solutions and other technology options that are economically efficient given no transaction costs. However, an important issue is whether

[50] Where they do, this option is unlikely to be free.

[51] This group of consumers may include the vulnerable customers, that is, those that may have difficulty paying utility bills.

[52] This does not necessarily imply that large customers receive half hourly price signals. However, the offers made to large customers are more likely to consider the actual profile of that customer.

these other options increase efficiency given the costs that would be incurred to obtain the benefits.

Issue No. 2

Comment is sought in relation to whether the current jurisdictional metering arrangements are a barrier to all consumers, or to groups of consumers, adopting economically efficient metering solutions or other technology options. Are there allocative efficiencies that may be captured by adopting alternative metering solutions or other technology options?

There is a range of:

- Metering solutions and other technology options; and
- Options for deploying these metering solutions and other technologies,

that may be considered as an alternative to the current metering arrangements. These metering technology options and deployment options are considered in the following sections. To determine whether these options are economically more efficient than the current metering arrangements for a jurisdiction, a detailed analysis of the costs and benefits would need to be undertaken. This analysis will not be undertaken as part of this Review.

3.6 Achieving efficiency with metering solutions and other technologies

The metering solutions and other technology options that may lead to economically efficient outcomes and have therefore been considered in this Issues Paper are:

- Accumulation meters (non time of use, or single rate, meters):
  - With additional profiling algorithms:
    - By reducing the area over which each profile applies; and
    - By increasing the number of profiling algorithms that are applied in each profile area;
  - With improved profiling algorithms, by netting off large customers that are not representative of those customers on the profile;
- Time of use (TOU) meters:
  - With existing profiling algorithms; and
  - With additional profiling algorithms, which apply only to those customers with time of use meters;
- Interval meters:
  - That are manually read;

  - That are remotely read; and
  - That have two-way communications capability; and
- Switching of peak and off peak loads in conjunction with any of the metering technologies listed above:
  - Using a static form of load control, for example, time switches; and
  - Using a dynamic form of load control, for example, ripple control; and
- Demand management options.

These options are discussed further in the following sections.

Prepayment meters provide an alternative mechanism for billing consumers, however in terms of measuring the consumption of energy, they are generally a form of TOU or interval meter. They have therefore not been considered as a separate option for the purposes of this paper.

3.6.1 Accumulation meters

The majority of first tier customers and small second tier customers have accumulation meters installed. Accumulation meters only record the energy consumption over a period of time; they have no time of use capability at all.

There are a number of options proposed which enable the profiles to be more cost reflective than currently. Each of these options allows accumulation meters to be retained, avoiding the substantial costs associated with installing more complex meters. Whilst the options enable profiles to be more cost reflective than the current arrangements, they do not enable cost-reflective tariffs that are possible with other technology options.

3.6.1.1 Additional profiling algorithms

Additional profiling algorithms may be prepared that improve the extent to which profiles are representative of the customers that are settled on the profile. The options available are to:

- Implement profiles over a smaller profile area. Currently profiles are prepared and applied by distributor. Profiles could be prepared and applied by, for example, groups of transmission node identifiers (TNIs) so that there are multiple profiles for each distributor's area. The disadvantages of this approach are:
  - The availability of metering data to determine the inflows to the smaller profile areas;
  - The increasing risk that the profile will be dominated by large customer loads as the profile area reduces; and

- Equity between customers – customers in close proximity, with similar loads, may be settled in the wholesale market on different profiles. When the profiles are based on distributor, there are a number of contributing factors to potentially different retail tariffs when the distributors are not the same. However, if the customers have the same distributor, then different profiles may be the only single factor contributing to different retail tariffs.

- Implement additional profiles in each profile area. A profile shape would need to be established for each additional profile based on sample meters or historical load data. From a practical perspective, the additional profiles may be limited to separately metered loads. That said, multiple profiles have been implemented in each profile area in the UK based on customer characteristics. However, there may be difficulties ensuring that customers are appropriately allocated to such profiles, for example, if a profile was introduced specifically for customers with air conditioning, the businesses would need to ensure that all air conditioning customers were identified.

  A controlled load profile ("CLP") could be introduced to Victoria and the ACT. However it should be noted that:

  - The CLP was not implemented in Victoria when FRC was introduced as the costs and risks of doing so appeared to outweigh the benefits. This risk is discussed by NEMMCO who have found that two distributors with CLPs have profiles with "negative values at around 11 pm", presumably because the "sample meter controlled-load profile shape provided by the [distributor is] too optimistic in terms of the energy volumes that switch each day"[53]; and

  - Historically hot water loads have not necessarily been separately controlled and metered in the ACT. It was therefore considered to be inequitable to introduce a CLP for those customers that happened to have their hot water load separately controlled and metered.

Additional costs would be incurred in the development and maintenance of any additional profile(s).

3.6.1.2 Improve profiling algorithms

The existing profiles could be improved so that they are more representative of profiled customers.

There are currently a number of large first tier customers with accumulation meters. These customers may have a different load profile to smaller customers and may distort the profile. If large first tier customers had interval meters installed, the profile would be calculated net of these customers' loads. The existing profiling algorithms could thereby be improved if all customers greater than, for example, 100 or 160 MWh per annum (depending on the jurisdiction) were required to install interval meters.

[53] NEMMCO, *Annual Metering & Retail Development Report 2003*, p. 37

The cost of an interval meter for these customers is relatively small compared to their average annual electricity bill, which is generally greater than $15,000 (varies by jurisdiction). Additionally, such an option would ensure that there was equity for all large customers, that is, all large customers, whether first tier or second tier, would have an interval meter installed.

3.6.2 Time of use meters

TOU meters are currently used to a limited extent in each of the jurisdictions. TOU meters allow consumption to be measured and stored in separate "buckets" of time, and generally will separately store weekday and weekend usage. As an example:

- EnergyAustralia uses the following time "buckets":
  - Peak times – 2pm to 8pm working weekdays;
  - Shoulder times – 7am to 2pm and 8pm to 10pm working weekdays, and 7am to 10pm weekends; and
  - Off peak times – all other times; whilst
- ActewAGL uses the following time "buckets":
  - Peak times – 7am to 5pm working weekdays;
  - Shoulder times – 5pm to 10pm working weekdays; and
  - Off peak times – all other times.

Accordingly, TOU meters enable more cost reflective tariffs than accumulation meters. However, TOU meters do not store the interval data that is required for wholesale market settlement. As a result, second tier customers with TOU meters are currently settled on the basis of the profile.

Whilst TOU meters are able to identify the consumption during the specified "buckets" of time[54], and may therefore provide an incentive to shift load from peak to off peak or shoulder periods, they are unable to identify consumption on specific days. TOU meters do not enable retailers to provide an incentive to reduce demand on specific days.

The number of customers with TOU meters is currently low[55] and therefore a separate profile for these customers would be difficult to justify. However, if the number of TOU meters were to increase, then a separate profile, similar to the CLP, could be justified. The resulting profile would then be more representative of the customers with TOU meters.

[54] As an example, Nilsen's EMS2600 series of TOU meters have up to 8 time of use registers

[55] Generally fewer than 1% of meters installed in any jurisdiction are TOU meters, with the exception of Tasmania

TOU meters are generally more expensive than interval meters based on current volumes and based on forecast volumes under a roll-out scenario. A single phase TOU meter currently costs approximately $120 compared to $100 for an interval meter. However the costs for processing the data from a TOU meter will be significantly less than the costs for processing data from an interval meter.

3.6.3 Interval meters

Interval meters are able to identify consumption during specific periods and on specific days.

While interval meters are more effective in terms of the ability provided to distributors and retailers to provide cost reflective signals to customers, they are also more expensive than the basic accumulation meter. Specifically, a single-phase interval meter (low volumes) typically costs $100 (meter only) whereas a single-phase accumulation meter is currently less than $35, compared to an average household electricity bill of $750 per annum. There are also substantial additional costs associated with the data from interval meters, for example, quarterly read interval meters have 4,380 pieces of data per meter reading compared to one piece of data from a quarterly read accumulation meter.

Interval meters will enable more accurate settlement of the wholesale market because each retailer's energy charges would be based on metered half hourly data. Interval meters may also enable retailers to better manage their exposure to high spot prices in the wholesale market. However, they may be more exposed as they will need to contract for energy based on their aggregate customers' actual load profiles, rather than an average profile.

The interval metering options that are considered in this Issues Paper are:

- Interval meters that are manually read. These are commonly referred to as metering installation type 5;
- Interval meters that are remotely read. These are commonly referred to as metering installation types 1 to 4, and are currently required for all second tier customers that consume greater than 160 MWh per annum (greater than 200 MWh per annum in Queensland). Additional benefits of these meters are the ability to remotely read the meters, and to obtain improved information about the operation and performance of the network; and
- Interval meters with two-way communication facilities. Other benefits of these meters may include:
  - Improved information available about the operation and performance of the network, including outage detection and remote power quality monitoring;
  - Ability to provide value added services such as energy management and security monitoring; and
  - Ability to perform certain functions remotely such as meter reads (scheduled, special, final), disconnections and reconnections.

3.6.4 Load control

Load control, as a tariff option, could be used in conjunction with any of these meters to simulate a demand management response by, for example:

- Switching off, or cycling, peak loads such as air conditioning and/or refrigeration during peak times; and
- Switching on additional off peak loads such as washing machines and dishwashers.

The loads could be controlled using:

- A static form of load control such as time switches; or
- A dynamic form of load control such as ripple control.

The advantage of a dynamic form of load control relative to a static form of load control is that the on and off times may be changed dynamically based on the actual daily loading of the network. The on and off times may be easily changed to adapt to any changes that occur in the use of electricity.

The main disadvantage of a dynamic form of load control is the cost to establish the infrastructure to, for example, inject ripple control signals into the network, particularly if the infrastructure is not currently installed.

3.6.5 Demand management options

Other technology options to consider include demand management options such as customer education and awareness programs, alternative retail tariff structures such as inclining block tariffs and seasonal tariffs, voluntary load shedding and demand bidding, and are detailed further in jurisdictional documents[56].

The demand management options supplement the metrology procedures and the Code, but do not impact directly on these instruments. They may however place additional requirements on the metering or other technology installed. Many of the jurisdictions have previously consulted on these options. Accordingly, they are not considered further in this paper.

[56] For example: IPART, *Inquiry into the Role of Demand Management and Other Options in the Provision of Energy Services*, October 2002; ESCOSA, *Position Paper: Demand Management for Distributors*, January 2003, CRA for VENCorp, *Electricity Demand Side Management Study – Review of Options and Issues for Government,* September 2001

3.6.6 Comparison of metering and other technology options

Each of the metering and other technology options identified in the previous section, with the exception of demand management options, is discussed within the assessment framework in Appendix B.

In summary, the greatest allocative efficiencies may be obtained using interval meters, however the costs of installing, and processing the data from, interval meters are likely to be substantial, but have not been assessed. Time of use meters enable more cost reflective pricing than accumulation meters, however they do not provide half hourly data and therefore profiling would still be required for settlement in the wholesale market. Additionally the cost of TOU meters is the same, if not higher than the cost of interval meters, although the costs for processing the data from TOU meters would be less than for processing the data from interval meters.

The lowest cost option is to retain the existing accumulation meters, but this option does not enable cost reflective pricing and hence limits achieving economic efficiency. More efficient pricing signals can be provided with additional profiles, however the improved pricing signals will be between profiles rather than between consumers on a specific profile. Depending on the profiles chosen, it may be difficult to identify and maintain the new profiles.

The existing profile may be improved by requiring all large customers, whether first tier or second tier, to have interval meters installed. This will improve the cost reflectivity of the profile itself, but will not improve the cost reflectivity between groups of customers on that profile. The number of interval meters to be installed would be small relative to the total meter population and the profile would be more representative of the smaller consumers.

Issue No. 3

In this section, a range of metering solutions and other technology options have been considered. Comment is sought as to whether there are other metering solutions or technology options that should be considered, consistent with increasing economic efficiency. Has the discussion, including the comparison of options in Appendix B, adequately considered the options related to metering solutions and other technology options?

Whilst various meter and other technology options are an **enabler** of more cost reflective options, the technology in isolation may not be sufficient to realise the full benefits associated with the technology. There are a number of other potential barriers to economically efficient metering solutions and other technology that are considered in the remainder of this paper.

3.7 Deployment options

Metering or other technology may be deployed under:

- A "market based" approach, whereby the customer has the option to install an alternative meter or other technology option; or
- An accelerated roll out, whereby targeted groups of customers are required to have a specific metering solution or other technology installed.

There is currently a "market based" approach for the adoption of meters, other than the distributor's standard meter, by small first and second tier customers. Where there are net private benefits to be derived by installing a different metering technology, a customer has the option of doing so.[57] However, the customer would generally be expected to pay an extra charge to cover the additional cost over and above the standard metering technology offering from the distributor, with an expectation that a tariff based on the meter will deliver lower electricity costs, giving rise to a net benefit.

The Victorian ESC[58] recently concluded that interval meters were unlikely to be adopted on a wide scale through a market-based approach due to:

- The lack of scale of economies in metering purchases and meter installation under a market based approach compared to a wide scale deployment;
- The fragmentation of the market – the party that incurs the costs does not necessarily capture the benefits;
- The cross subsidies inherent in profile based solutions, which currently benefit many customers;
- The up-front costs associated with installing an interval meter;
- The risk of meters subsequently being removed and thereby not enabling costs to be fully recovered; and
- Positive externalities that cannot be captured by an individual, such as environmental benefits and an overall reduction in the cost of supply.

It may be argued that regulatory intervention is required to ensure that any net industry benefits of a more economically efficient technology are obtained.

A number of deployment options have been identified in the following section. If an accelerated approach to deploying technology is adopted, it would be need to be based on a comprehensive cost benefit study that optimises the costs of the roll out relative to the benefits that may be delivered.

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[57] The presence of a net benefit is not a necessary condition, but it is likely that a customer would install a more expensive metering technology only if there was an expectation of net benefits.

[58] ESC, *ibid*, p.23.

3.7.1 Options for deploying economically efficient metering solutions or other technology

An option for deploying economically efficient metering solutions or other technology may be applied:

Option a To all consumers

Option b Only to customers consuming above a determined consumption level, for example, more than the threshold for type 6 metering installations (100 MWh per annum in New South Wales and 160 MWh per annum in the other jurisdictions)

Option c Only to specified groups of customers based on type of use, for example, to those with high peak loads

The options for deploying economically efficient metering solutions or other technology that have been identified, which can be applied under one of the above scenarios are as follows:

Option 1 Continue with existing "market based" approach

Option 2 Implement new profiling algorithms

Option 3 "Market based" approach where all second tier customers are required to install interval meters

Option 4 Accelerated roll out to all customers over a shorter time frame, say 5 years

Option 5 Accelerated roll out to all customers over a longer time frame, say 10 years

Option 6 Accelerated roll out based on a "new and replacement" policy, that is economically efficient metering solutions are installed for all new and replacement meters

As an example, if options 4 and b are adopted, then an alternative technology is installed for all customers consuming above a certain threshold, over a 5 year period.

3.7.2 Comparison of deployment options

The deployment options identified in the previous section are discussed within the assessment framework in Appendix C. Whilst the costs and benefits for each of these options will vary significantly, an analysis of the costs and benefits has not been undertaken.

In summary, the lowest cost option is the continuation of the market based approach, however there are no economies of scale associated with this option and the benefits are captured by the customer exercising the choice rather than the market as a whole. It is expected that the customers that will exercise the choice will be those with a lower cost profile. Accordingly, the smeared costs for the customers remaining on the profile would be expected to increase over time.

If the market based approach was modified so that all second tier customers were required to install interval meters, then this may be a barrier to customers switching retailers, subject to the cost recovery approach for these meters.

The economies of scale associated with a 5 year roll out are greater than with a 10 year roll out or a new and replacement policy, and the benefits are captured sooner. However, the capital outlay is substantial and there are greater logistics challenges with a more aggressive roll out.

A roll out based on the size of customer or type of use allows the roll out to be more targeted to enable the benefits of the roll out to be optimised relative to the costs incurred.

Issue No. 4

In this section, a range of options for deploying metering solutions and other technology have been considered. Comment is sought as to whether there are other deployment options that should be considered. Has the discussion, including the comparison of options in Appendix C, adequately considered the issues related to deployment options?

4 Responsibility for metering services

Customer metering has assumed an enhanced role in the competitive market. Metering does not just determine the customer bills, but settlement between the retailer and the market and the commercial arrangements between the retailer and the network. Determining who is responsible for, or who can own the meter, is important to the operation of the market and to innovations that benefit customers.

In this section we discuss whether the current metering services arrangements create a barrier to the adoption of economically efficient metering solutions and other technology. Metering services are defined to encompass:

- Meter provision, which includes the supply, installation and maintenance of metering installations; and
- Metering data services, which include the collation, processing and storage of, and provision of access to, energy data.

Meter ownership is discussed in section 5.

4.1 Current arrangements

The party that is currently responsible for metering services differs based on whether the customer is:

- A first tier customer;
- A small second tier customer; or
- A larger second tier customer.

A small second tier customer is one that consumes less than 100 MWh per annum in NSW, one that consumes less than 160 MWh per annum in the ACT, South Australia and Victoria, and one that consumes less than 200 MWh per annum in Queensland.

The current arrangements are summarised in the following table and discussed in further detail in the following sections.

Table 2: Party currently responsible for metering services

	First tier	Second tier
Small customer	Distributor	Responsible Person is the distributor (derogation)
Large customer	Distributor	Responsible Person is the distributor or retailer

Note: There are some exceptions to this table, which are described in the following sections

4.1.1 First tier customers

Distributors generally have responsibility for metering services for first tier customers. The only exception is NSW where meters, provided by the distributor at the distributor's cost, may be installed by Accredited Service Providers (ASPs) at the customer's cost.

4.1.2 Second tier customers

Under the Code, the Responsible Person has responsibility for the supply, installation and maintenance of meters. The Responsible Person may be either:

- The retailer[59]; or
- The distributor, where nominated by the retailer[60].

Clause 7.2.3 of the Code requires the Responsible Person to appoint Metering Provider(s), which are accredited and registered with NEMMCO, to install and maintain metering installations. The distributor may also be the Metering Provider[61].

4.1.2.1 Small second tier customers

Currently, each jurisdiction that has introduced FRC has derogated from the Code to allow the distributor to exclusively be the Responsible Person for small second tier customers. This "exclusivity derogation" applies to all customers with metering installations types 5, 6 and 7[62] in the ACT, South Australia and Victoria, that is, all second tier customers consuming less than 160 MWh per annum. The "exclusivity derogation" in NSW applies to all customers with metering installations types 6 and 7, and to those customers, with a metering installation type 5, that consume less than 100 MWh per annum[63].

In the case of NSW and Victoria, the current derogations expire on 1 July 2004, the current derogation for South Australia ceases on 1 July 2005 while the current derogation for the ACT expires on 28 February 2006.[64] If arrangements are not made for the existing arrangements to continue, metering services will not exclusively be the responsibility of the distributor as it has been.

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[59] National Electricity Code, clause 7.2.3

[60] National Electricity Code, clause 7.2.2

[61] National Electricity Code, clause 7.4.2(c)

[62] Metering installation type 7 applies to an unmetered load

[63] For NSW, the derogation for type 5 meters applies only to those second tier customers who consume less than 100 MWh per annum (see clause 9.17A.0(a) of the Code). Thus, in NSW, 2nd tier customers with a type 5 meter who consume between 100 MWh and 160 MWh per annum are subject to the competitive metering provisions of the Code.

[64] See clauses 9.9A.2, 9.17A.0, 9.30.1 and 9.24A.2 of the Code for Victorian, NSW, South Australian and ACT derogations, respectively.

These transitional arrangements for small second tier customers are generally consistent with the metering service arrangements for first tier customers, and ensure equity in metering services for all small customers.

4.1.2.2 Larger second tier customers

Metering services for larger second tier customers are competitive, that is, the Responsible Person may be either the distributor or retailer in accordance with the provisions of the Code. When a larger customer transfers to a second tier retailer, the metering services arrangements for the customer transfer from a monopoly service provided by the distributor to a competitive service provided by the distributor or retailer. That is, there is currently not equity in the metering services arrangements for large customers.

Metering data services for large second tier customers are provided by Metering Data Agents, who are agents of NEMMCO[65].

4.1.3 Charges for metering services

The costs associated with providing the distributor's standard metering services to first tier customers are generally recovered from customers through the DUoS charges. Where the customer chooses a different type of meter, the additional costs associated with that meter are charged to the customer through an extra charge. The costs for metering data services are recovered through an extra charge in Victoria only, at present. The same charge applies to all first tier customers, regardless of the type of meter installed.

The costs of providing metering services to second tier customers, where the distributor is exclusively the Responsible Person, are recovered in the same way as for first tier customers.

Separate metering service charges are levied on second tier customers that have metering services provided on a competitive basis. Where the costs of meter provision and meter reading have not been unbundled from the prescribed distribution services then these customers will also be charged for the distributor's standard offering through the DUoS charges.

At this stage, no jurisdiction has unbundled costs for meter provision from the network charges, and only Victoria has unbundled costs for metering data services (principally meter reading) from the network charges. Distribution prices are currently being reviewed in a number of jurisdictions[66] requiring decisions with respect to the extent that these charges need to be unbundled.

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[65] National Electricity Code, clause 7.9.1

[66] The current regulatory period is mid 2004 in NSW and ACT, mid 2005 in South Australia and end 2005 in Victoria. The end date for the current exclusivity derogations in NSW and South Australia coincide with the end

4.2 Why do the current arrangements for small second tier customers exist?

Exclusive responsibility for metering services was originally introduced as a transitional measure to address issues of cost and complexity which would have arisen had competition in metering services been introduced simultaneously with the introduction of FRC. The exclusivity derogation ensured that, in most cases, metering services continued to be provided by the distributor to all small customers, whether first tier or second tier.

This transitional measure was justified on the basis that the benefits provided by exclusivity (over the transitional period) would outweigh the costs. More specifically, exclusivity would[67]:

- Ensure that switching was simple and would therefore be encouraged, which in turn would maximise the wider benefits that might arise as a result of switching;
- Simplify the development of systems and processes required for the introduction of FRC;
- Delay any benefits from competition in metering. However, these benefits were expected to be relatively small over the transition period due to the economies of scale in the provision of these services and the likely switching rate during the early stages of competition;
- Avoid a cost disadvantage to second tier retailers by maintaining the economies of scale in meter provision and metering data services; and
- Avoid meter churn (i.e. replacement) when customers switched retailers, which could potentially occur if retailers were aligned to different Metering Providers.

While (monopoly) distributors are responsible for metering services within their distribution area, many distributors engage contractors to provide metering services and all distributors procure meters based on a competitive tendering process. Additionally there is competition in metering installation services in New South Wales through the ASP scheme. Therefore, some of the benefits of competition may already be captured in relation to metering services (i.e. via competition in the market, rather than for the market).

The metering services arrangements that apply with an exclusivity derogation, and those that apply without an exclusivity derogation, are illustrated in Figure 2 below.

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of the current regulatory period, whereas the current Victorian derogation expires prior to the end of the current regulatory period and the current ACT derogation expires after the end of the regulatory period.

[67] For further details, please refer to the applications made by the jurisdictions for the exclusivity derogation

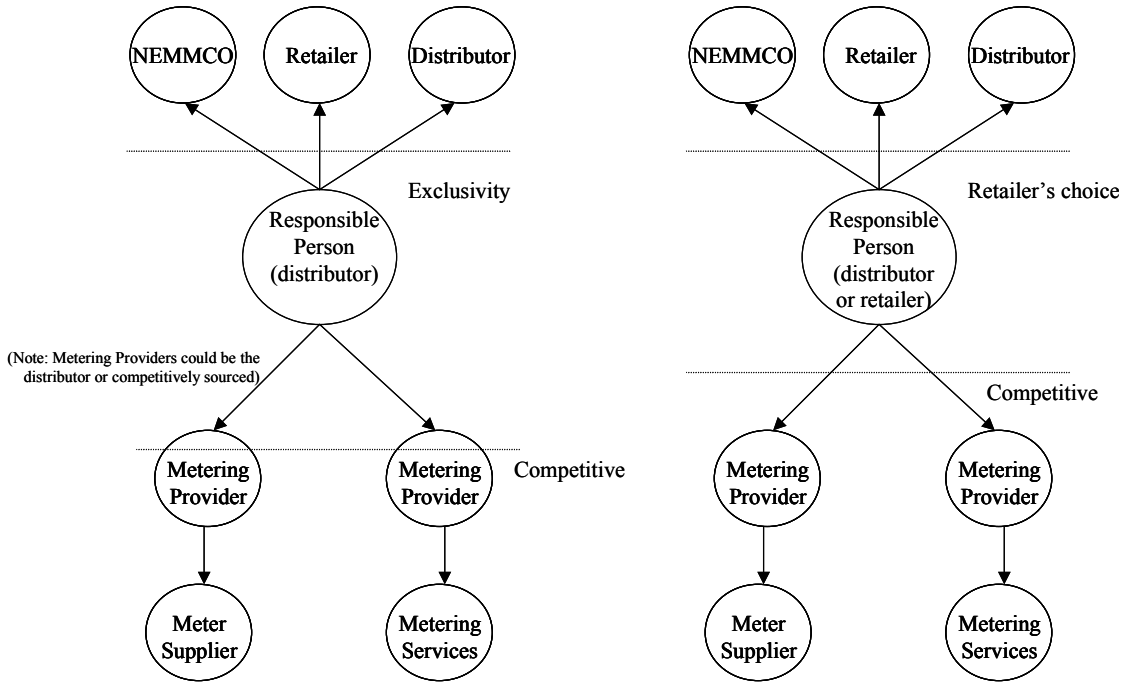

Figure 2: Metering services arrangements that apply when there is and is not an exclusivity derogation

4.3 Are the current arrangements for small second tier customers a barrier to adopting economically efficient technology?

Exclusivity may be a barrier to economically efficient metering solutions and other technology options because it is possible that the choice of Responsible Person may result in these services being provided more cheaply than where there is no choice. However, given the reasons outlined above explaining why exclusivity was initially sought, the more important issue is whether the benefits of having competition in the provision of metering services would outweigh the costs that exclusivity was designed to avoid.

The trade-off is therefore between the:

- Benefits of expanding the "scope" of retail competition to cover metering services; and
- Costs of the additional complexity that might be associated with providing these services and any impacts this might have on the effectiveness of retail competition generally.

The key advantage of having competition in metering services is that it may facilitate innovation, both in terms of the types of meters installed and the way in which those meters are read. Currently, small customers, and their retailers, are generally constrained to the

distributor's standard offering. Accordingly, the existing arrangements may be a barrier to the adoption of economically efficient metering solutions and other technology options.

There is, however, a counter argument to this, namely that the economies of scale from exclusivity may enable innovation. Exclusivity may enable, for example:

- The distributor to establish the infrastructure required for automated meter reading or meters with two way communication;
- The distributor to negotiate consolidated manual meter reading routes with other parties, such as the water and gas companies; and
- If the decision was made to accelerate the roll out of an economically efficient metering solution or other technology options, economies of scale associated with that accelerated roll out to be maximised, and provide a mechanism to smear the costs of any such roll out.

Competitive metering services may inhibit the productive efficiencies associated with retail competition by increasing the potential for:

- Meter churn; and
- Increased metering costs, including additional costs due to the stranding of assets, resulting in a lack of effective competition.

There are also a number of additional issues that need to be considered if the distributor was no longer exclusively responsible for metering services:

- Operational complexities, including maintenance and testing of meters, ensuring universal metering, coordination of processes across multiple parties, and load control;
- Potential barrier to entry for retailers that do not have the skills to take responsibility for metering services;
- Continuity of metering services if there is a retailer of last resort (ROLR) event; and
- Potential barrier to customers switching retailer if metering services are provided on a competitive basis.

In light of the above, the benefits of introducing competition in metering services need to be viewed in the context of the relative importance of metering services compared to the total retail service. Metering services account for about 15% of the total cost of the retail function. The total cost of the retail function itself represents a limited proportion of the retail electricity tariff, which largely consists of regulated network charges and energy costs.

This implies that a small change in the effectiveness of retail competition could result in a greater change in the costs or benefits to consumers than the introduction of competition in metering services.

These issues are considered further in the following sections.

There is currently between small first and second tier customers in the metering services arrangements, that is, the distributor is currently responsible for metering services for all small first and second tier customers. If the current metering service arrangements for small second tier customers are considered to be a barrier to these customers adopting economically efficient metering solutions and other technology options, then the issue is whether the current metering service arrangements for first tier customers, large customers and/or small customers, are a barrier to these customers adopting economically efficient metering solutions.

4.3.1 Meter churn

If the retailer was the Responsible Person, then there is a risk of meter churn, that is, the uneconomic turnover of functioning metering installations, when there is a change in retailer and thereby Responsible Person. A lack of standardisation in metering technologies may limit the ability of alternative metering providers engaged by the new Responsible Person to, for example, read the meter. Accordingly the meter is often churned when there is a new metering provider.

If the retailer was the Responsible Person, meter churn may be an issue because the meter life, which is generally 15 years for electronic meters and 40 years for electromechanical meters, exceeds:

- The period of time for which a customer remains with a given retailer. A potential change in retailer occurs every 3 years or so; and
- The period of time a person generally occupies a building. A change in residence, which may lead to a change in retailer for the occupant of that building, occurs every 7 years on average for owner occupied premises and more frequently for tenanted premises.

Meter churn is uneconomic because:

- There is an increased risk of stranded costs (which is discussed in section 4.3.2.1);
- Additional costs are incurred removing the existing functioning meter and installing the new meter; and
- There is a "hassle" factor from the disruption to the customer's supply during the meter changeover.

Meter churn continues to be an issue for larger second tier customers where there are competitive metering services. To date, the issue has not been resolved because the costs of metering for these large customers are generally small relative to the electricity bill.

4.3.2 Potential for increased costs

If metering services were provided on a competitive basis, then there is the potential for metering service costs to increase due to, for example:

- The loss of the economies of scale that distributors have in the purchase of meters;
- The loss of the economies of scale that distributors have in testing meters. Meters for small customers are sample tested based on classes of meters. If multiple parties have responsible for the same class of meter, then each of them will be responsible for testing a sample of the meters[68];
- The loss of the economies of scale that distributors have in manually reading meters. Two or more service providers may cover similar meter reading routes, resulting in non-contiguous meter reading routes, meter route changes and higher meter reading charges;
- The risk of stranded costs, which is discussed further in the following section;
- The higher rate of return required by the Responsible Person where metering services are provided on a competitive basis to ensure the recovery of costs over a shorter (non-regulated) period; and
- The lack of standardisation in meters. If there is a process that minimises meter churn, then Metering Providers may need the capability to receive data from any number of metering technologies.

As a result, there may not be effective competition for metering services.

4.3.2.1 Stranded costs

The risk of stranded costs leads to uncertainties with respect to recovering the costs of assets associated with the metering services function. The types of assets at risk include the meters themselves[69], the equipment to read the meters, and the IT systems for managing the metering data. As a result, in a competitive environment, the assets are generally depreciated over a shorter period than the life of that asset. Where there is currently competition, meters are generally depreciated over a 3 to 5-year period, rather than the life of an electronic meter of at least 15 years.

There is a significant cost associated with the risk of stranded costs as illustrated in the following table. The table provides an example of the incremental cost for the provision and installation of a single-phase interval meter provided on a competitive basis and provided on an exclusive basis.

[68] Jurisdictional Metrology Procedures, clause 2.4

[69] These are often not put back into service as they are damaged during removal and/or the costs of testing the meter to put it back in service are not justified.

Table 3: Example of impact of competition and/or alternative meter ownership arrangements on meter charges[70]

Scenario	Annual cost of interval meter
Competitive – depreciation over 5 years	$64.55 per annum
Exclusivity, distributor ownership – depreciation over 15 years	$33.34 per annum
Incremental cost	$31.21 per annum

For many small consumers, the incremental cost of a meter in a competitive environment relative to an exclusive environment is significant relative to the annual electricity bill.

4.3.3 Operational complexities

4.3.3.1 Maintenance and testing of meters

If metering services were competitive for small customers, processes may need to be put in place to ensure that meter testing is undertaken at required intervals and that the testing complies with national standards.

4.3.3.2 Universal metering

Universal metering refers to the situation where all premises are metered, except where it has been agreed that the load may be unmetered, to minimise electricity theft. If there is one party responsible for metering of small customers, then there is one party responsible for ensuring all customers are metered and all customers' meters are read.

Continuous meter reading routes (as are currently the case for small customers) assist in ensuring universal metering, by ensuring that all recorded NMIs are read and every premise along a street is observed.

4.3.3.3 Coordination of processes across multiple parties

The need for appropriate coordination processes across multiple parties is an additional cost associated with competitive metering services. If there were competitive metering services, there are a number of processes that would need to be coordinated to ensure that appropriate standards are maintained, including:

[70] Excluded service charge for AGL and CitiPower (non CBD), including the cost of meter provision, installation and maintenance

- Metering Provider change – the rate at which Metering Providers change for a metering installation would increase if the metering services were competitive;
- Meter removal – if the meter were removed (or churned), then processes would be required to:
  - Minimise the disruption to the customer when the meter is replaced;
  - Ensuring that the customer is not without a meter between the time that a meter is removed by the old Metering Provider and the time that a new meter is installed by the new Metering Provider. This will require co-ordination;
  - Ensuring that the meter is read before the meter is removed and that the meter reading is delivered to the appropriate parties;
- Meter records – if the meter was not removed, ensuring that the records for that meter are provided to the new Metering Provider;
- Meter reading:
  - Historical metering data would be required by the new Metering Provider for the purpose of substitutions and estimations;
  - The need to communicate any changes in the meter reading schedule to the customer;
- Disconnections - the need to communicate with two parties – the distributor to disconnect the customer and the Metering Provider to do the final read – rather than one party; and
- Fault management and provision of emergency services – an increase in the number of parties dealing with a premise significantly increases the risk of poor coordination, misunderstandings, delays and disputes in managing faults, and that these risks will impact negatively on customer service standards.

Business to business (B2B) processes need to be streamlined and the number of transactions and communications between market participants need to be minimised to ensure that costs and the likelihood of errors and delays are minimised for all parties. The electricity industry has been developing standards for B2B processes, however these are still relatively immature and, in many instances, still undertaken manually.

Whilst the focus in this section to date has been on metering installation types 5 and 6, the exclusivity derogation also covers metering installation type 7 (unmetered supplies). The energy data for metering installation type 7 is calculated on the basis of:

- The agreed load per device type when "switched on" (referred to as a Load Table);
- The agreed device types installed, the number of units of each device type and the operating regime for each device type (referred to as an Inventory Table); and
- The agreed schedule defining when devices are "switched on" and "switched off" (referred to as the On/Off Table).

If metering services for metering installation type 7 were competitive then there would need to be coordination between multiple parties with respect to:

- Transferring load tables, inventory tables and on/off tables to multiple Metering Providers; and
- Maintaining the inventory table, based on asset management records from the distributor for distributor-owned assets (such as public lighting) or from the customer for customer-owned assets (such as night watchman lights).

The coordination of these processes introduces additional cost and complexity.

Additionally, there is an incentive for a retailer, as the Responsible Person for a type 7 metering installation, to change the inventory and load tables. The distributor, as the Responsible Person, arguably, does not have the same incentive.

4.3.3.4 Load control

The distributor benefits from load control by shifting load from peak to off-peak times and thereby removing constraints in the distribution network. The retailer does not have the same incentive to manage the loading on the distribution network. However, the retailer has an incentive to provide the lower off-peak retail tariffs, which are generally associated with controlled circuits, to customers.

If the retailer had responsibility for metering services, then:

- Who has the responsibility for load control devices, which are not required for wholesale settlement of the market?
- Who ensures that the load control devices continue to operate to maximise the benefits to the distribution network (and ultimately to the customer)?
- Who ensures that load control devices continue to be installed to maximise the benefits to the distribution network (and ultimately to the customer)?

If the distributor continues to have responsibility for metering services, then:

- Who ensures that the load control devices continue to operate to enable an off peak tariff to be offered by retailers to customers?
- Who ensures that load control devices continue to be installed to enable an off peak tariff to continue to be offered by retailers to customers?

4.3.4 Potential barrier to entry for retailers

Some retailers may not have the appropriate skills and expertise to be responsible for metering services. Under the Code, the distributor would then assume responsibility for providing metering services. However, under such an arrangement the distributor may not

necessarily make an offer that is considered to be fair and reasonable. As a result, potential retailers may choose not to enter a particular market.

4.3.5 Continuity of metering services if there is a ROLR event

NEMMCO has noted that "jurisdictional procedures make provision for the failure of a retailer and replacement of a failed retailer by a Retailer of Last Resort (ROLR). In circumstances where the failed retailer is also the Responsible Person, there is currently no procedure for determining the new Responsible Person"[71] and ensuring the continuity of metering services. Such a situation does not arise where the distributor is exclusively the Responsible Person.

This issue does, however, still arise for larger second tier customers.

4.3.6 Potential barrier to customers switching retailers

If metering services for second tier customers are provided on a competitive basis, then this could be a potential barrier to customers switching retailers, due to:

- The potentially increased costs associated with metering services that have been identified; and
- The "hassle" factor, particularly if the meter is changed and the billing schedule is changed.

4.4 International experience

Competition in the provision of non half-hourly metering and data services was introduced in the United Kingdom from 1 April 2000. The key reason for moving to competitive metering was the perceived benefit of innovation in new services. It was not because there was abuse of monopoly power.

The introduction of metering competition has created regulatory challenges for the separation of price controls for metering services and other prescribed distribution services. However, at this stage, there is little evidence to suggest that competitive metering arrangements have had a positive or negative impact on customers.

Further details are provided in Appendix G.

[71] NEMMCO, *Annual Metering Report 2002*, p.22

4.5 Options for metering services arrangements

The current arrangements for metering services may be creating a barrier to the adoption of economically efficient metering solutions and other technology. A number of options for removing this barrier have been identified, which are as follows:

Option 1 Introduce competitive metering services for small second tier customers as required under the Code, that is, allow exclusivity to lapse as per the current derogations.

Option 2 Distributor continues to exclusively provide metering services for small second tier customers for a further transitional period, that is, extend the exclusivity period.

Option 3 Distributor continues to exclusively provide metering services for small second tier customers in perpetuity, that is, amend the Code to remove the option for competitive metering services for small second tier customers.

Option 4 Distributor continues to exclusively provide metering services for small second tier customers, except those customers that have elected to pay for a meter, other than the distributor's standard offering.

Option 5 Distributor continues to exclusively provide metering services for small second tier customers, but only for meter provision.

Option 6 Distributor continues to exclusively provide metering services for small second tier customers, but only for metering data services.

Option 7 Distributor exclusively provides metering services for all second tier customers consuming less than 160 MWh per annum, that is, NSW consistent with the other jurisdictions.

Option 8 Distributor continues to exclusively provide metering services, but only for second tier customers consuming less than 100 MWh per annum, that is, all jurisdictions consistent with NSW.

Option 9 Introduce competitive metering services for first tier customers that consume above the threshold level of the exclusivity derogation.

These options are not mutually exclusive. The different possible combinations are as follows:

- Option 1 and optionally, option 9; or
- Option 2 or 3, and optionally, option 4, and optionally, option 5 or 6, and optionally, option 7 or 8, and optionally, option 9.

The options are discussed within the assessment framework in Appendix D.

In summary, there are efficiencies where the distributor is responsible for metering services for all small customers. The arrangements are equitable between small first and second tier customers and there are benefits from a reduction in the risk of meter churn and therefore stranded costs. There are economies of scale arising from the costs of the meter itself, the installation of that meter, the reading of that meter and the data processing costs. However, such an arrangement does constrain small customers to the distributor's standard metering offer, although customers currently have the option to pay for alternative metering services.

The distributor, as Responsible Person, currently sources the goods and services for this role on a competitive basis and there is thus competition within the metering services. If the metering services were provided by the distributor or the retailer there may be further efficiency gains. However, these are unlikely to be significant relative to the customer's total electricity bill.

The exclusivity arrangements may be continued for a further transitional period, or in perpetuity through a Code change or may be continued for a subset of small customers. Extending the exclusivity arrangements in perpetuity provides the greatest level of certainty in the industry, and hence may lead to reduced costs.

There is currently an inequity between large first tier and second tier customers. While metering services are generally provided exclusively by the distributor for large first tier customers, they are provided by the distributor or the retailer for large second tier customers. The additional costs that may potentially be incurred when there is a choice of Responsible Person, will be incurred equally by large and small customers. However, these costs are insignificant relative to the electricity bill for large customers.

Issue No. 5

In this section, alternative metering services arrangements are discussed. Comment is sought as to whether the current metering service arrangements are a barrier to consumers adopting economically efficient metering solutions and other technology. If so, are there any other options that should be considered in relation to the responsibility for metering services? Has the discussion, including the comparison of options provided as Appendix D, considered adequately the issues related to metering services arrangements?

5 Meter ownership

In the previous section, the current metering service arrangements were discussed to identify whether they may be a barrier to consumers adopting economically efficient metering solutions and other technology options. A related issue is meter ownership. Meter ownership options need to be explored if the related metering services are competitive. Where the distributor is exclusively responsible for metering services, then arguably, it is appropriate that the distributor continues to own meters.

The Code specifically requires this Review to also consider whether "meter ownership acts as a barrier to customer switching".[72] In its determination on the FRC Code changes, the ACCC stated that it

> *is concerned that meter ownership may act as a barrier to competition and is also concerned that this issue has not been adequately addressed in the code or by the jurisdictions. In the above 160 MWh market, the cost savings that are derived from lower electricity prices readily outweigh the cost of the meter. However, in the below 160 MWh market, these cost savings may be outweighed by the cost of the meter. The Commission believes that it is unlikely that a retailer will bear the cost of a meter when the risk of a customer switching could leave a large portion of the metering cost stranded. This may mean that retailers charge customers upfront for the meter, and there is the risk that this may deter customers from changing retailers.*
>
> *However, the Commission considers that under contestability, arrangements could potentially be developed to overcome such barriers. For example, second tier retailers might lease meters from first tier retailers. In this sense, allowing the retailer to own meters may not necessarily be a barrier to competition.*[73]

In this section, meter ownership is first defined and then the current meter ownership arrangements are identified. There is a discussion as to whether the meter ownership arrangements may act as a barrier to the adoption of economically efficient metering solutions and other technology, and to customers switching retailers. Alternative meter ownership options are identified and discussed within the assessment framework.

5.1 Definition of meter ownership

A meter is defined in the Code as "a device complying with Australian Standards which measures and records the production or consumption of electrical energy". **Meter ownership**, in the context of this paper, means to have the legal right, subject to relevant regulations, to:

- Decide how and where the meter will be deployed;

[72] National Electricity Code, clause 7.13(g)(1)(i)

[73] ACCC, *Determination on Full Retail Competition and Registration of Code Participants,* August 2001, p.23

- Have access to the meter;
- Provide adequate security and protection for the meter;
- Charge another party for using the meter; and
- Sell and receive the proceeds from the sale of the meter,

and the legal obligation to:

- Account for the asset as required by relevant accounting standards; and
- Ensure the meter complies with the *National Measurement Act 1960*.

5.2 Current meter ownership arrangements

The Code does not specify any requirements in terms of meter ownership; when the Code was originally developed it was on the basis of a competitive metering services framework in which the meter could be owned by a number of different parties.

Legislation and supporting regulations in each of the jurisdictions do not place any restrictions on which party may own a meter, except in Victoria where a customer may not own a meter[74]. However, historically, distributors have included meters in their regulatory asset base and have therefore recovered the costs of these meters through DUoS charges.

When the previously vertically integrated electricity authorities were disaggregated into separate distribution and retail businesses, meter ownership was allocated to the distributors. Since then:

- Distributors have continued to install meters on new premises, as required by jurisdictional codes;
- Where a first tier customer or second tier customer, for which metering services are exclusively provided by the distributor, has chosen to have a meter, other then the distributor's standard offering, installed, the distributor is obligated to provide that meter. The meters have been included in the asset base (not the regulatory asset base) and the costs of these meters have been recovered from the customer through an extra charge. These customers have also paid for the distributor's standard metering through the DUoS charges; and
- The meters for second tier customers, for which metering services are provided on a competitive basis, are generally owned by the Responsible Person (which may be the retailer or the distributor). There are some examples where the customer owns the meter.
- The exception is South Australia, where the provision of type 4 meters to all customers above 750 MWh per annum is a prescribed distribution service.

[74] ESC, *Electricity Metering Code*, Clauses 2.2(a) and 2.7(a)

5.3 Are the current meter ownership provisions a barrier to adopting economically efficient technology?

The current restrictions in regard to meter ownership may be a barrier to economically efficient metering solutions and other technology options if choice in meter ownership results in lower costs of meters to consumers than under the existing meter ownership model. The more important issue to consider is whether the benefits of having choice in regard to meter ownership would outweigh the costs that the restriction is designed to avoid.

The trade-off is therefore between the:

- Benefits of expanding the "scope" of retail competition to cover meter ownership; and
- Costs of the additional complexity that might be associated with allowing parties, other than the distributor or Responsible Person, to own meters.

The benefits and costs associated with the restrictions on meter ownership should be viewed in the context of the value of meter ownership relative to the total retail service. Meters only account for a very small proportion of the retail electricity tariff. Therefore improvements in the productive efficiency associated with competition in meter ownership are likely to be modest. However, meter ownership could introduce the possibility of more cost reflective prices (although the problems associated with this have already been discussed) and more innovation in meter acquisition (which could overcome some of the reticence to the uptake of economically efficient metering or other technology options).

This implies that a small change in the effectiveness of competition in the retail market could result in greater change in the costs or benefits to consumers than a change in meter ownership.

The key advantage of alternative meter ownership arrangements is the potential to facilitate innovation, both in terms of the types of meters installed and the way in which those meters are read as retailers and customers are not constrained to the distributor's standard meter. Accordingly, ownership of meters by the distributor may be a barrier to the adoption of economically efficient metering solutions and other technology options.

However, as discussed in section 4.3, there is a counter argument that the economies of scale arising from continuing to vest ownership of meters with the distributor may enable lower costs.

5.4 Is meter ownership a barrier to consumers switching retailers?

If a party, other than the distributor, owns the meters for small customers, then this may create a barrier to that customer switching retailers. This barrier may arise as a result of:

- A meter, owned by a party other the distributor, being of a type that is not commonly used, and:

- Can only be read by a limited number of Metering Providers, that may not be accessible to the new retailer;
- Can or will only be tested by a limited number of Metering Providers, that may not be accessible to the new retailer; or
- Does not provide metering data in a form that is compatible with the new retailer's tariff.

- The potential for meter churn and stranded costs, which are discussed in sections 4.3.1 and 5.4.1;
- The potential for increased metering costs, which is discussed in section 4.3.2;
- The potential barrier to entry to retailers that do not have the skills to take responsibility for meter ownership, resulting in reduced choice of retailers and subsequently offers for consumers. This is discussed in section 4.3.4; and
- The potential for anti-competitive retailer behaviour, which is discussed in section 5.4.3.

Other issues that need to be considered if the current meter ownership arrangements were to change are:

- Operational complexities, including maintenance and testing of meters, ensuring universal metering, coordination of processes across multiple parties, and load control. These issues are discussed in section 4.3.3; and
- The logistics associated with removing meters from the regulatory asset base and transferring ownership, which is discussed in section 5.4.2.

5.4.1 Stranded costs

The meter costs will be stranded where a functioning meter is removed and the costs for that meter are unable to be recovered over the economic life of that meter. As discussed in section 4.3.2.1, the annual cost for a meter increases significantly relative to a small customer's electricity bill if there is a risk that the meter costs will be stranded.

The risk of stranded costs increases if the retailer, with short-term contracts with customers, owns the meter. Options to mitigate this risk are for the retailer to:

- Remove its meter and re-deploy it elsewhere – although this will incur additional costs to remove the existing meter and install a new meter, and will inconvenience the customer during the process. Additionally, there may be costs incurred re-testing the meter prior to it being deployed elsewhere;
- Sell or lease the meter to the new retailer – which may result in anti-competitive retailer behaviour and is discussed in section 5.4.3; or
- Not expose itself to this risk by leasing the meter from a third party, assuming that this service is available.

5.4.2 Removal of meters from the regulatory asset base

If a party other then the distributor were to exclusively own meters, then the distributor would face the challenge of removing the meters from the regulatory asset base and transferring ownership to the appropriate party. This would require:

- Identifying the meter costs specific to each customer. It is our understanding that it is unlikely that the distributor's asset management system would enable this to occur;
- Identifying the appropriate party that will own the meter; and
- Receiving payment from that party for those meter assets.

This challenge could be mitigated by the distributors retaining ownership of existing assets, and providing multiple parties with the option to own new meters.

Transferring of the meters to other parties could also lead to a situation where the meters are stranded. The other parties may choose to install new meters rather than assume ownership of the existing meters. This could be mitigated by imposing an obligation on the other parties to own the existing meters, which in turn may hinder moves towards more economically efficient metering solutions or other technology options.

5.4.3 Anti-competitive retailer behaviour

If a retailer, or a third party with a strong relationship with the retailer, owns the meter then this can create a barrier to end-users switching retailers because the retailer:

- Could refuse to sell or lease their meter to the new retailer, or customer, thus forcing the new retailer to install another meter; or
- Impose an unreasonably high charge on the new retailer for the use of the meter. The alternative for the new retailer would be to pay for a new meter and for the installation of the meter.

Requiring a new meter to be installed could also be an inconvenience to the customer.

The Ministry of Energy and Utilities in NSW, however, notes that there are incentives for meter owners, including retailers, to offer competitive terms for transferring or leasing the meter to a new retailer[75].

> *"This is because if an older meter owner / retailer does not offer reasonable terms for use or transfer of the meter, then the new retailer always has the option of replacing the meter. It would not be in the commercial interests of the old retailer for this to occur as it lowers their return on the meter asset. This is because physical removal of the meter, and redeploying it elsewhere, will add to the overall operating and costs over the life of the meter."*

[75] NSW Ministry of Energy and Utilities, *Metering Services Competition: Consultation Paper*, April 2003, p.30

Thus, anti-competitive behaviour may be a relatively minor barrier to the adoption of an efficient metering solution.

5.5 International experience

5.5.1 New Zealand

Meter ownership in New Zealand was transferred to the retail businesses when the retail and distribution functions were disaggregated in 1998/99. Meters can now be owned by:

- The customer;
- The customer's retailer;
- The customer's former retailer;
- The distributor; or
- An independent meter company.

Second tier retailers have the choice of:

- Installing their own meter; or
- Leasing the first tier retailer's meter.

In practice, first tier retailers have tended to lease the meter to the second tier retailer. However, in the early stages of FRC this created a barrier to customers switching retailers because of the second tier retailer's reliance on the first tier retailer. A Ministerial Enquiry into the Electricity Industry in 2000 concluded that:

> *"Retail company ownership of meters has impeded the efficient switching of customers, contributing to unnecessary delays and costs that are ultimately borne by consumers. On the other hand, were the meters to have remained with the distribution companies, they would be provided by a monopoly. There are gains to be made in having meters provided in a properly functioning competitive market."*

The enquiry concluded that no specific changes to meter ownership were required, but that other proposed changes, particularly relating to the protocol for consumer transfers, should assist in resolving any issues arising out of meter ownership.

5.5.2 United Kingdom

In May 2002, distributors in the United Kingdom owned all basic meters and about three quarters of interval meters in their distribution area. From April 2002, retailers and customers have had the option to own meters with the introduction of competitive metering services. However, distributors are required to provide a default non-discriminatory meter

provision and meter operation service in their distribution area. If a distributor sells its metering business, its metering obligations still remain. It can fulfil its obligations by contract.

Ofgem plans to remove metering assets from the distributor's regulatory asset base in the next distribution price control period, which starts in April 2005.

Retail licence conditions introduced to support the choice of ownership include:

- Upon application made by any person, a retailer that owns a meter shall offer to enter into an agreement for the sale, hire or loan of the meter;
- The retailer is obligated to make an offer as soon as practicable after the receipt of an application;
- Retailers are prohibited from entering into any agreements for the provision of metering equipment which is intended or likely to restrict, distort or prevent competition in the supply of electricity;
- Leased meters are included in the definition of "owned" meters;
- An outgoing retailer is not allowed to recover a meter that it owns when the incoming retailer has undertaken to give the outgoing retailer appropriate compensation for the meter; and
- An outgoing retailer will remove its meter from a customer's premises as soon as is reasonably practicable following a written request from the incoming retailer.

5.6 Alternative meter ownership models

If the existing meter ownership model was considered to be a barrier to customers switching retailers, or a barrier to adopting economically efficient metering solutions and other technology, then alternative meter ownership models may be considered, which include:

Option 1 Meter ownership is vested with the retailer.

Option 2 Meter ownership is vested with the customer.

Option 3 Meter ownership is vested with the distributor.

Option 4 Meter ownership is vested with a third party.

Option 5 Meter ownership may be vested with the retailer, the customer, the distributor or a third party.

These alternative meter ownership models may be applied to small and /or large customers, and are discussed within the assessment framework in Appendix E.

In summary, the current ownership model, whereby the distributor generally owns the meter, is efficient in that it minimises the risk of meter churn and thereby stranded costs, it minimises the potential for increased costs that may occur under the other options, the operational complexities and the logistics challenges associated with a change in ownership.

However, there may be advantages in the other ownership models with respect to facilitating innovation in meter technology and metering data services. That said, customers currently have the option to pay for a meter other than the distributor's standard offering under the existing meter ownership model. There may also be potential for efficiency gains, although these are expected to be minimal relative to the customer's total electricity bill.

Where the retailer is the Responsible Person, the retailer may currently own the meter. Accordingly there may be an inequity between large first and second tier customers. There may be merit in considering alternative meter ownership models for large customers, as distinct from small customers. The meter ownership issue is therefore dependent, to some extent, on the decisions that are made with respect to metering services.

5.7 Required changes to regulatory instruments

If the decision were made to transfer the ownership of meters from the distributor, then jurisdictional regulatory instruments would require amendments. The most significant changes are in relation to:

- The definition of prescribed distribution services;
- Removing the obligations in jurisdictional instruments which require the distributor to provide and install a meter;
- If a third party owns the meters, additional obligations may need to be placed on that party, for example, should that party be licensed by the regulator or is it sufficient for that party to be registered and accredited as a Metering Provider?
- If a retailer owns the meters, additional obligations may need to be placed on the retailer, including:
  - Requiring a retailer to transfer ownership of a meter on reasonable terms at the request of the customer;
  - Requiring that if the retailer leases the meter, this effectively means that they own the meter; and
  - Requiring a retailer to disclose to customers any charges they would impose or any intention to remove the meter if a retail contract was terminated; and
- If a customer owns the meters, clear obligations with respect to:
  - Ensuring that the meter complies with the required standards;
  - Ensuring that the meter is tested and maintained in accordance with the required standards;

- Ensuring that a meter is installed; and
- Allowing access to the meter and to metering data to the appropriate parties; and

- In Victoria, if a customer owns a meter, an amendment to the Metering Code to allow customers to have a proprietary interest in metering[76].

Issue No. 6

In this section, alternative meter ownership options have been discussed, and the changes required to regulatory instruments to implement any change have also been discussed. Comment is sought as to whether the existing meter ownership model is a barrier to consumers switching retailers or a barrier to consumers adopting economically efficient metering solutions or other technology. Should any other options be considered in relation to meter ownership? Which party should own the meters? Has the discussion, including the comparison of options provided as Appendix E, considered adequately the issues related to meter ownership?

[76] ESC, *Electricity Metering Code,* July 2001, clauses 2.2(a) and 2.7(a)

6 Other legal and regulatory issues

In the previous sections the barriers to the adoption of economically efficient metering solutions and other technology options, which have been discussed, are the current metering arrangements, the current metering services arrangements and the ownership of meters. Options to removing these barriers have been discussed. Whilst the removal of these barriers may enable economically efficient metering solutions and other technology options, there are a number of additional legal and regulatory issues that need to be addressed if these options are to be adopted.

The key legal and regulatory barrier to the adoption of economically efficient metering solutions and other technology options is the flexibility for distributors to vary the structure of distribution tariffs and for retailers to vary the retail tariffs for first tier customers to make them more efficient. This issue is discussed in section 6.1.

Other minor legal and regulatory issues that are considered in this section are the "non reversion" policies that are applicable to interval meters, the period over which metering data is stored, the provision of access to metering data, and enforcement of unique Australian metering standards.

6.1 Distribution and retail tariffs

Whilst an appropriate metering or other technology can enable more cost reflective tariffs, the benefits of these more cost reflective prices can only be fully realised where there are both efficient distribution and retail tariffs. In the first instance, cost reflective distribution tariffs are essential for achieving efficiencies in the network, and these tariffs need to be reflected in the retail tariffs in order for customers to be able to respond. As a minimum, cost reflective distribution tariffs would provide for:

- Non-uniform tariffs, to enable more cost reflective distribution tariffs to be introduced progressively as economically efficient technology is installed;
- Locational price signals, so as to encourage efficient development of the distribution network; and
- Time of use pricing, such as peak, off-peak and critical peak tariffs, to encourage efficient use of the distribution network.

Where there are restrictions placed on the ability for distributors to develop cost reflective tariffs, and the ability of those tariffs to be reflected in retail tariffs, the potential benefits of adopting an efficient metering solution will be diminished.

As noted by the (former) Office of the Regulator-General:

> *"It is clear that tariff structures have an important role to play in providing price signals in situations in which demand management may be a cost-efficient alternative to further network*

> *investment. In particular, the development of coincident peak pricing has the potential to enhance the price signals provided at times of peak demand regarding the costs imposed by users contributing to demand at that time, and the cost-effectiveness of potential alternatives."*[77]

In some jurisdictions (eg. Victoria and as proposed in NSW) regulators have introduced a weighted tariff basket form of price control. It is argued that this form of price control provides distributors with an incentive to charge cost reflective prices. However, there are commonly restrictions placed on the annual movements to distribution pricing. These are specifically allowed for under clause 6.14.4(a) of the Code:

> *"The Jurisdictional Regulator may place limits on the annual variation in published distribution service prices. Any such limits must be specified by the Jurisdictional Regulator at the commencement of the regulatory control period and are to apply for the duration of the regulatory control period."*

The Queensland Competition Authority argues side constraints, which are a limit on annual variations:

> *"... aim to promote price stability and to increase the certainty and consistency of regulatory outcomes. By preventing price shocks for end users, side constraints limit the amount of re-balancing that can occur in any one year in the pursuit of more efficient (or more equitable) prices."*[78]

Additionally there are constraints in relation to:

- New tariffs that may be offered to customers[79]; and
- The way in which tariffs may be assigned to customers[80].

The same flexibility required in the setting of distribution tariffs is also required in the setting of first tier retail tariffs, that is, non-uniformity, locational signals and time of use tariffs. The ability to capture allocative efficiencies will be reduced significantly if first tier retail tariffs are not efficient because the majority of small consumers are still first tier.

In an effective competitive market, first tier retail tariffs will not be constrained by non-market forces. However in the meantime there are commonly constraints placed on the movements in first tier retail tariffs from year to year. In some jurisdictions the retail tariffs are constrained by the government and in others they are constrained by the regulator.

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[77] ORG, *Electricity Distribution Price Determination 2001-05, Volume 1: Statement of Purpose and Reasons*, September 2000, p.202.

[78] Queensland Competition Authority, *Regulation of Electricity Distribution*, Final Determination, May 2001, p.146.

[79] As an example, refer to the South Australian Electricity Pricing Order, clause 5.2

[80] As an example, refer to the South Australian Electricity Pricing Order, clause 3.5

Second tier retail tariffs are set in a competitive market and are not constrained by non-market forces.

If the restrictions on distribution and retail tariffs are considered to be a barrier to the adoption by consumers of economically efficient metering solutions and other technology, then a range of legal and regulatory instruments would need to be reviewed, and amended, where required.

6.2 Non-reversion of interval meters

In recognition of the long term role of interval meters in the settlement of the wholesale electricity market and in anticipation of a possible future accelerated roll out of interval meters, Victoria, South Australia and the ACT have "non-reversion" provisions whereby;

- An interval meter may not be replaced by an accumulation meter; and
- An interval meter must be read as an interval meter.

These provisions apply to both first and second tier customers in Victoria and South Australia through the jurisdictional Metering Code and metrology procedure, respectively, and to second tier customers only in the ACT through the metrology procedure.

NSW did not envisage an accelerated roll out of meters, preferring to adopt only a "market based" approach to installing interval meters. Accordingly an interval meter cannot be replaced with an accumulation meter, but an interval meter may be read as an accumulation meter.

The decision was made to not allow interval meters to be replaced by accumulation meters, so that in the event of an accelerated roll out of interval meters, the roll out program is not undermined by the removal of existing interval meters. Additionally, reversion of the meter is inefficient by imposing additional costs on other customers, including:

- The costs of physically changing the meter if the costs of the accumulation meter are absorbed by the distributor and passed through to customers through use of system charges;
- Overcoming the complexity of allocating costs to customers where meter changes occur (for example, who pays the costs of reverting to an accumulation meter where the previous occupant installed the interval meter? How are the costs associated with each individual meter tracked?); and
- The stranded costs to the party that initially provided the interval meter (although the interval meter may be employed elsewhere).

The decision was made in jurisdictions, other than NSW, that interval meters were to be read as interval meters, so that the benefits associated with an accelerated roll out were not undermined, that is:

- The additional interval metering data was to be used to further improve the profile; and
- Customers with interval meters were to be removed from the profile so that they may have more efficient pricing.

ESC noted that the "non-reversion" policy:

> *"... ensures that interval meters that have entered the market are required to continue in the market because of the importance of accurate interval energy data for settlement".*[81]

Consistent with these provisions, a customer that chooses an interval meter, presumably because the benefits are expected to exceed the costs, pays the cost of the interval meter. However the costs of reading accumulation and interval meters are smeared across all customers, so that no customer is penalised if a previous occupant has had an interval meter installed that cannot be subsequently removed.

NEMMCO has indicated that it believes a non reversion policy may act as a barrier to the adoption of interval meters:

> *"While the costs of collecting and processing data remain relatively higher than the collection and processing of basic accumulation metering data (type 6) there will be an impediment to the use of interval meters in meter replacement programs, and hence a barrier to the widespread introduction of type 5 meters."*[82]

NEMMCO notes that interval meters are currently being installed at a greater rate in NSW compared to other jurisdictions.

The distributors in the other jurisdictions are recovering the higher costs associated with collecting and processing data from interval meters. The issue then is why are interval meters being installed at a lower rate in these jurisdictions. Is it a function of the non-reversion policy or is it due to other factors?

If the non-reversion policy is considered to be a barrier to the installation of interval meters, the non-reversion provisions in the metrology procedures and jurisdictional metering instruments may need to be amended accordingly.

6.3 Storage of metering data

The volume of data from an interval meter is over 4,000 times more than from an accumulation meter, based on a quarterly reading[83]. The costs of storing metering data from

[81] ESC, *Review of Victorian Electricity Supply Industry Metrology Procedure*, Issues Paper, April 2002, p.5

[82] NEMMCO, *Annual Metering Report 2002*, p.35

[83] An interval meter has 48 intervals of data per day whereas an accumulation meter has one data per meter reading which is commonly 4 or 12 times per year

an interval meter are therefore significantly greater than the costs of storing data from an accumulation meter. The subsequent costs that each market participant incurs meeting the metering data storage requirements in the various regulatory instruments may act as a barrier to the adoption of an economically efficient metering solution or other technology options.

NEMMCO is required under the Code to store metering data for all second tier metering installations for a period of 7 years. The jurisdictional metrology procedures were drafted so that the Responsible Person was only required to store metering data for 35 days, if the data was stored in another database for 7 years. This decision was made so that data was not stored in multiple databases for a period of 7 years, as there may be a significant volume of metering data over this period.

In Victoria, NSW and South Australia, the distributor is required to store the metering data from first tier metering installations for a period of 7 years. However, where an interval meter is installed, the metering data may be required to be sent to NEMMCO to use in preparing the profile. This metering data is an input to the settlement process and is therefore stored by NEMMCO for a period of 7 years.

If the provisions relating to the storage of data are considered to be a barrier to the adoption of economically efficient metering solutions and other technology options, the barrier may be removed by amending the jurisdictional instruments. The jurisdictional instruments could be amended so that the metering data for first tier meters is stored for a shorter period of time by distributor if the metering data is stored elsewhere for a period of 7 years, and is accessible to the distributor.

6.4 Access to metering data

Metering data service costs will increase as the number of parties that access the data increases and as the level of aggregation of the data decreases. These costs may be a barrier to adopting economically efficient metering solutions and other technology options.

Under clause 7.7(a) of the Code and clause 3.7 of the published jurisdictional metrology procedures, the market participants that have access to the metering data in a second tier metering installation, include:

- The Metering Provider;
- The appropriate distributor;
- The retailer; and
- The local retailer.

The NEM is settled on the basis of differencing, that is, the local retailer is charged for all the energy consumed in its local area, less the energy consumed by second tier customers. The account statement for the local retailer is thus dependent on the energy consumed by

second tier customers. Therefore the local retailer requires access to second tier metering data to reconcile its account statement.

Metering data is generally currently provided to the local retailer as a matter of course. Thus, the costs of providing the metering data to the local retailer are incurred irrespectively of whether or not the data is required or is used by the local retailer.

If the provisions relating to the storage of data are considered to be a barrier to the adoption of economically efficient metering solutions, the barrier may be removed by requiring the local retailer to access the metering data through NEMMCO's MSATS system. If the local retailer requires that metering data to reconcile its account statement, the metering data would be accessed on an as needed basis. Additionally, the account statement may be able to be reconciled from aggregated data rather than disaggregated data. However, the local retailer would be able to obtain disaggregated data if required to reconcile its account statement.

6.5 Enforcement of unique Australian metering standards

Many of the meters manufactured for the global market meet International Electrotechnical Commission (IEC) Standards, but do not necessarily meet standards that are unique to Australia.

There is concern that if unique Australian standards are enforced this may create a barrier to the adoption of economically efficient metering solutions.

- There would be a reduction in the economies of scale because meters manufactured in high volume for other markets would not be able to be brought to Australia without modification or further testing in Australia;
- The range of meter types available in the Australian market will be significantly limited. International meter manufacturers would be less likely to participate in the Australian meter market because, to do so, they would need to produce special versions of their meters that are compliant with the Australian standards for a market that represents only 1% of the world market for meters; and
- Innovation in metering types used in Australia would be constrained. Many innovative meter types, some of which are low volume specialised meters, would not be available to the Australian market as the redesign requirements, and the retesting requirements will be too onerous for international meter manufacturers to justify.

To ensure that unique Australian standards for metering do not create a barrier to the adoption of economically efficient metering solutions or other technology options, any unique requirements need to be carefully considered prior to inclusion in any legal or regulatory instrument.

Issue No. 7

In this section, the following legal and regulatory issues, which may be a barrier to the adoption of economically efficient metering solutions and other technology options, have been discussed: the flexibility to vary distribution and retail tariffs; the "non reversion" policies that are applicable to interval meters; the period over which metering data is stored; the provision of access to metering data; and enforcement of unique Australian metering standards. Are these legal and regulatory issues barriers to the adoption of economically efficient metering solutions and other technology? Are there other legal and regulatory issues which need to be considered?

7 Ring-fencing

In its determination on the FRC Code changes, the ACCC stated that it

> *is concerned that … joint distribution/retail businesses may misuse their position to deter other retailers from entering the market. To address this problem, the Commission has imposed a condition requiring that, by 31 December 2002, the jurisdictional regulators review the effectiveness of the current ringfencing arrangements for prescribed and other services in preventing anti-competitive conduct between the distribution businesses, its retail business and the metering businesses.*[84]

Accordingly, clause 7.13(i) of the Code states that:

> *The Jurisdictional Regulators must, by 31 December 2002, review the effectiveness of the ring-fencing arrangements for prescribed services and other services in their respective jurisdictions:*
>
> *(1) in preventing anti-competitive conduct;*
>
> *(2) in providing transparency; and*
>
> *(3) in providing confidence in the integrity of the competitive market arrangements between the Distribution Network Service Providers, Customers, and Metering Providers.*

The jurisdictional regulators have decided to include part (3) of the requirement above as part of this joint review.

In this section the Code requirements for ring-fencing are identified and the ring-fencing arrangements in each jurisdiction are discussed.

7.1 The Code requirements for ring-fencing

Separation (ring-fencing) of monopoly elements of the market from competitive elements may be required to ensure that the power derived from a monopoly business does not lead to adverse outcomes in the competitive sectors. The effective operation of the market may require:

- Ring-fencing between the distributor and its related retailer; and
- Ring-fencing between the distributor's metering business that is provided as a prescribed service, the metering business that is provided as a non prescribed service and the metering business that is provided as a contestable service.

[84] ACCC, *Determination on Full Retail Competition and Registration of Code Participants,* August 2001, p.24

Jurisdictional regulators were required under the Code to produce distribution ring fencing guidelines by 1 January 1999. Clause 6.20.2(b) of the Code states:

> *"Ring-fencing guidelines must be developed by each Jurisdictional Regulator ... for the accounting and functional separation of the provision of prescribed distribution services by Distribution Network Service Providers ... from the provision of other services by such Distribution Network Service Providers ...."*

These ring-fencing guidelines generally require that monopoly and contestable elements of a business be separated, legally or operationally. In addition, accounting separation requires that costs be appropriately allocated between the monopoly and contestable elements of the business. However, these requirements are not mandatory and, consequently, there are variations in the ring-fencing requirements in each jurisdiction.

These different forms of ring-fencing are not mutually exclusive. They are briefly outlined below.

7.1.1 Legal separation

The jurisdictional ring-fencing guidelines developed under the Code may include[85]:

> *provisions defining the need for and extent of legal separation of the entity through which a [distributor] provides network services from any other entity through which it conducts business.*

Therefore, to the extent required by a jurisdictional ring-fencing guideline, a legal entity that provides network services must be legally separated from its other businesses. However, a company that provides network services could own a subsidiary that, for example, provides competitive metering services, or it could be a subsidiary of a company that conducts a related business. In other words legal separation does not of itself prevent a monopoly business and a related business from falling under common ownership and control.

7.1.2 Accounting separation

Accounting separation requires a monopoly business to account to the regulator for the costs, assets and liabilities of its monopoly, separately from that of other businesses that it may provide.

This information can assist a regulator to monitor the actual costs and returns earned by a business and help a regulator to better understand the forecast costs and returns on which a price determination may be predicated. Where a regulator makes a price determination based on such costs there would be risks of excessive prices if the costs allocated to the monopoly business were to include costs more properly attributable to other business

[85] National Electricity Code, clause 6.20.2(c)(1)(A)

activities. As an example, a businesses' monopoly metering business could be subsidising its competitive metering business.

Only where there is legal separation *and* no other business is conducted within the same legal entity as the monopoly business and that legal entity is obliged to produce audited statutory accounts, would normal statutory financial reporting requirements fulfil accounting separation needs. Otherwise, accounting separation would require regulatory accounting requirements to be specified.

The jurisdictional ring-fencing guidelines developed under the Code may include[86]:

> *provisions defining the need for and extent of:*
>
> > *(B) the establishment and maintenance of:*
> >
> > > *(ii) consolidated and separate accounts for prescribed distribution services and other services provided by the [distributor] provides network services from any other entity through which it conducts business;*
> >
> > *(C) allocation of costs:*
> >
> > > *(ii) between prescribed distribution services and other services provided by the [distributor].*

7.1.3 Operational ring-fencing

Operational ring-fencing has the objective of preventing activities or the transfer of information that may act to lessen competition or the fair conduct of the market. For example, the distributor's competitive metering business may hold detailed metering information about customers who purchase their energy through an unrelated retailer. This information would have commercial value if provided to the related retailer.

Operational ring-fencing may take one or more of the following forms:

- physical separation;
- separation of staff; and
- separation of information.

The jurisdictional ring-fencing guidelines developed under the Code may include[87]:

[86] National Electricity Code, clause 6.20.2(c)(1)(B) and (C)
[87] National Electricity Code, clause 6.20.2(c)(1)(D) and (E)

provisions defining the need for and extent of:

(D) limitations on the flow of information between the [distributor] and any other person; and

(E) limitations on the flow of information where there is the potential for a competitive disadvantage:

(i) between those parts of the [distributor's] business which provide prescribed services and parts of the [distributor's] business which provide any other services; and

(ii) between those parts of the [distributor's] business which provide prescribed distribution services and parts of the [distributor's] business which provide any other services.

7.2 Jurisdictional requirements

The ring-fencing guidelines that have been developed vary by jurisdiction. Additionally, there are various licence, Code and guideline requirements related to ring-fencing, which also vary by jurisdiction. The ring-fencing requirements (legal, accounting and operational separation) that have been adopted in each jurisdiction are summarised in the following sections.

The Code requires that the ring-fencing arrangements be reviewed to ascertain their effectiveness in:

- Preventing anti-competitive conduct;
- Providing transparency; and
- Providing confidence in the integrity of the competitive market arrangements between the distributors, customers and Metering Providers.

In discussing the effectiveness of the ring-fencing arrangements, regard has been had to whether the arrangements:

- Ensure appropriate operational separation;
- Ensure non-discriminatory access to data; and
- Apply to a distributor's metering business.

7.3 ACT

ActewAGL is licensed in the ACT as an electricity distributor and retailer.

The distribution licence requires the distributor to comply with any applicable ring fencing requirements[88]. The jurisdictional regulator in the ACT has recently issued a ring fencing guideline[89]. The ring-fencing guideline requires[90]:

- Legal separation between the distributor and retailer;
- Separation of accounts;
- Operational separation of various services, including:
  - Meter provision and meter reading; and
  - Processing of data generated from these activities;

  The operational separation encompasses:
  - Physical separation;
  - Separation of staff; and
  - Non-discriminatory access to information systems and business processes; and
- Business to be conducted at arm's length and in a competitively neutral manner.

7.4 New South Wales

The four New South Wales distributors each have a related retail business. They are required to keep separate accounting and business records for the distribution business[91].

Ring fencing guidelines have been developed by IPART and came into effect on 1 July 2003. However the ring-fencing guidelines are directed towards operational separation with respect to contestable services also provided by ASPs. For example, clause 2.1.1 of the NSW ring-fencing guidelines[92] states that:

> *"A [distributor] must provide a prescribed distribution service to an independent accredited service provider on terms that are no less favourable than the terms on which it provides that*

[88] ACT Distribution licence, clause 6.2

[89] Independent Competition and Regulatory Commission, *Ring Fencing Guidelines for Gas and Electricity Network Service Operators in the ACT*, November 2002

[90] Independent Competition and Regulatory Commission, *ibid,* clause 3.1

[91] NSW Distribution Licence. Ministerially imposed condition 3.4.2 states that "a [distributor's] distribution system operation affairs must be kept separate from its other affairs…"

[92] IPART, *Distribution Ring-Fencing Guidelines*, February 2003.

prescribed distribution service to that part of the [distributor's] business which provides contestable services."

Furthermore, clause 2.1.2 of the NSW ring-fencing guidelines states that:

"A [distributor] must not treat a customer more or less favourably than another because the customer engaged or elected not to engage the [distributor] to provide it with contestable services."

The ring-fencing guidelines require:

- Physical separation of offices (clause 5.2);
- Information separation (clause 5.3); and
- Separation of operation staff (clause 5.4).

These requirements for operational separation are effective from 1 January 2004, with the following exceptions:

- Requirements for physical separation of offices for Country Energy and Australian Inland Energy are effective from 1 July 2004; and
- Requirements for separation of Australian Inland Energy's operational staff are effective from 1 July 2004.

The ring-fencing guidelines do not consider the ring-fencing of the distributor in a broader context.

7.5 Queensland

In Queensland, there is "legal separation..(and)…requirements for separate accounting and reporting by distribution and retail entities"[93].

Clause 1(h) of the Queensland ring-fencing guidelines[94] states that the distributor that provides prescribed distribution services must not:

"… provide distribution network access to a related business on more favourable terms than those it provides to any other customer or Code participant."

The ring-fencing guidelines require separation of information and marketing staff, unless "Chinese wall protocols" are in place.

[93] Queensland Competition Authority, *Electricity Distribution: Ring-Fencing Guidelines – Final Determination*, September 2000, p. 11

[94] Queensland Competition Authority, *Electricity Distribution: Ring-Fencing Guidelines*, September 2000.

Assuming that "distribution network access" includes metering services, whether they are prescribed or non-prescribed distribution services, then these guidelines ensure appropriate operational separation and non-discriminatory access.

7.6 South Australia

The distributor and retailer are separate legal entities in South Australia. The legislation states that:

> *"the issue of the licence will not result in the same person holding both a licence authorising the operation of a distribution network and a licence authorising retailing of electricity"*[95].

The requirements for accounting separation are provided in guidelines issued by ESCOSA[96].

The South Australian ring-fencing guidelines[97] require ring-fencing of metering services regardless of whether they are or are not a prescribed service. Clause 3.3 of the ring-fencing guidelines states:

> *"The [distributor] must ensure that, in providing goods or services for which the [distributor] is the monopoly supplier to a Related Business or a competitor of the Related Business, these goods and services are provided on a non-discriminatory, commercial basis."*

The ring-fencing guidelines also require separation of information and staff, however, these specific provisions do not come into effect until 1 January 2004[98].

7.7 Tasmania

Aurora Energy holds both a distribution licence and a retail licence in Tasmania.

The ring-fencing obligations for distributors in Tasmania, which are set out in Chapter 11 of the Tasmanian Electricity Code, address the separation of accounts but do not address structural ring-fencing issues.

Clause 11.2 of the Tasmanian Electricity Code requires the distributor to establish and maintain a separate set of accounts in respect of its activities as a retailer, where the

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[95] Electricity Act (South Australia) 1996, s. 17(2)(ac)

[96] ESCOSA, *Guidelines 1, 2 and 3: Electricity Regulatory Information Requirements,* June 2003

[97] ESCOSA, *Operational Ring Fencing Requirements for the SA Electricity Supply Industry*, Electricity Industry Guideline No.9, June 2003.

[98] ESCOSA, *Operational Ring Fencing Requirements for the SA Electricity Supply Industry*, Electricity Industry Guideline No.9, June 2003, clause 3.10

distributor is also a retailer. An accounting ring-fencing guideline[99] has been published that details the way in which separate accounts are to be prepared and business records are to be maintained.

There is currently no provision requiring non-discriminatory access to distribution services. However, there is provision in the Tasmanian Electricity Code to review and modify the existing ring fencing obligations to ensure that there is non-discriminatory access "in the supply or purchase of services"[100].

7.8 Victoria

Victoria does not have ring-fencing guidelines; however, the (former) Office of the Regulator-General released a Position Paper on ring-fencing in May 2001[101]. The Position Paper states that:

> *"requirements for legal separation of distribution and retail operations for electricity ... should not be applied at this time"*[102].

However over the last couple of years, there have been a number of acquisitions in the industry resulting in a higher degree of legal separation between distributors and retailers, as summarised in the following table:

Distributor	Associated retailer
CitiPower (Powercor)	Origin
AGL	AGL
United Energy	AGL
TXU	TXU
Powercor	Origin

The Victorian distributors are required under their licence to have separate accounts[103].

The distribution licences currently include a non-discriminatory access obligation:

[99] Office of the Tasmanian Energy Regulator, *Electricity Distribution Accounting Ring-fencing Guideline, Electricity Guideline No. 2.2*, June 2.2

[100] Tasmanian Electricity Code, clause 11.3(a)(2)

[101] Office of the Regulator-General, *Ring-fencing in the Electricity and Gas Industries – Position Paper*, May 2001

[102] Victorian distribution licences, clause 20.1

[103] Victorian distribution licences, clause 25

> *"In conducting its distribution business, the Licensee must not unreasonably discriminate, or have the effect of creating unreasonable discrimination, between retailers or between customers of any retailer."*[104]

Furthermore, the Position Paper[105] envisages that ring-fencing guidelines should require operational separation of the following services:

- Meter provision and meter reading; and
- Processing of data generated from these activities.

The operational separation encompasses:

- Physical separation of staff providing these services; and
- The retail arm having no greater access to information systems and business processes for providing distribution services than is available to any other retailer.

7.9 Comparison of jurisdictional ring fencing arrangements

In summary:

Jurisdiction	Effectiveness of ring fencing arrangements
ACT	Ring fencing guideline published that refers explicitly to metering services.
New South Wales	Ring-fencing guideline came into operation on 1 July 2003. Some parts are not effective until 1 January 2004, while other parts are not effective until 1 July 2004. Specifically refers to the ring-fencing of the distributor's services provided by ASPs, but not ring-fencing in the broader context.
Queensland	Ring-fencing guideline published.
South Australia	Ring-fencing guideline published. Specific provisions related to separation of staff and information are not effective until 1 January 2004.
Tasmania	No ring fencing guideline that addresses operational separation or non-discriminatory access.

[104] Office of the Regulator-General, *ibid*, p. 32
[105] Office of the Regulator-General, *ibid*, p. 41

Jurisdiction	Effectiveness of ring fencing arrangements
Victoria	No ring-fencing guidelines published, however distribution licences ensure that there is non-discriminatory access to distribution services.

Issue No. 8

Comment is sought in relation to the effectiveness of the jurisdictional ring fencing arrangements in preventing anti-competitive conduct between the distribution business, retail business and metering business. Has the discussion adequately considered the issues related to ring-fencing?

8 National consistency of metrology procedures

Metrology procedures have been published for each of the jurisdictions, where FRC has been introduced, to facilitate the conversion of metering data into a format suitable for use in the current wholesale markets settlement system. The metrology procedures are a mechanism for communicating jurisdictional policy decisions relating to some aspects of FRC to the market. The ACCC was concerned that the benefits of FRC would be reduced without nationally consistent metrology procedures and therefore the Code requires that this Review "consider options for a single nationally consistent metrology procedure for each of metering installation types 5, 6 and 7"[106].

Prior to considering the options for nationally consistent metrology procedures an understanding of the published metrology procedures is required. A metrology procedure is first defined and the scope of a metrology procedure is described. The differences between the jurisdictional metrology procedures are identified and the rationale for these differences is discussed. A number of provisions in the metrology procedures, which are currently replicated in NEMMCO documents, are identified.

A range of options for increasing the extent to which the jurisdictional metrology procedures are more consistent have then been identified. The options are compared and the changes that are required to the Code to implement the options are identified.

8.1 What are metrology procedures?

The Code defines a metrology procedure as:

> *"A document that contains information on the devices and processes that are to be used to measure, or determine by means other than a device, the flow of electricity in a power conductor to convey the measured or determined data to other devices using communication link(s) to prepare the data using devices or algorithms to form metering data and to provide access to the metering data from a telecommunication network. In relation to type 5 and 6 metering installations, the document may also contain requirements for the engagement and payment of Metering Providers and, where applicable, must contain requirements for the provision of relevant details of the metering installation to the responsible person. The document can specify, in relation to metering installation types 5, 6 and 7 (as specified in Schedule 7.2 of the Code), in what circumstances energy data held in metering installations within the relevant participating jurisdiction, can be used by Distribution Network Service Providers to calculate charges for distribution service for the purposes of clause 6.16.1(e)."*

NEMMCO has the responsibility for metrology procedures for metering installation types 1 to 4[107], whilst the Jurisdictional Regulators, as the Metrology Coordinators, have

[106] National Electricity Code, clause 7.13(f)(2)

[107] These meters are defined in Appendix A

responsibility for the metrology procedure(s) for metering installation types 5, 6 and 7 for their jurisdiction.

The Code contains technical requirements with which the metrology procedure(s) must comply. The metrology procedure must not deviate from the Code. It must be consistent with, or an extension of, the Code.

The metrology procedures for metering installation types 5, 6 and 7 describe:

- The metering equipment: the requirements on the meter, data logger (where applicable) and instrument transformers (if required);
- The metering and data collection process: the method of interval data measurement for second tier customers, and how the data is to be collected from the metering equipment and delivered to the data collection system. This includes:
  - collection of interval data from metering installation type 5;
  - collection of consumption data from metering installation type 6;
  - where energy data is unavailable within NEMMCO's settlement timetable, the process for estimating energy data;
  - where half hourly energy data is unavailable (metering installation types 6 and 7) the process for creating interval data using a profiling methodology; and
  - the way in which the profile will be derived and applied;
- The data validation and substitution process: a description of the process for validating energy data and substituting energy data where required;
- The data storage process: the requirements on the metering installation database;
- The data distribution process: the requirements for distribution of data to NEMMCO and other relevant parties;
- Telecommunication link between the metering installation database and the NEM settlement system; and
- The capabilities of the Metering Provider(s): the capabilities that a Metering Provider requires to undertake each of the processes for each of the metering installation types.

8.2 Requirement for a Review

When the FRC Code changes were first introduced, the ACCC expressed a concern that the potential benefits of FRC may be reduced unless a nationally consistent approach to metrology procedures was developed.[108] The Victorian distribution businesses also argued

[108] ACCC, *Determination on Full Retail Competition and Registration of Code Participants,* August 2001, p.6.

that, the greater the consistency between jurisdictions, the lower would be the cost of entry for new retailers.[109]

However, NECA contended that:

> *"... although consistency in metrology procedures is highly desirable to minimise the costs faced consumers, different regulatory frameworks apply across the NEM and, therefore, a flexible approach is required in the development of the metrology procedures."*[110]

The ACCC subsequently approved Code changes that allowed for jurisdictional differences in metrology procedures. However in its final determination on the FRC Code changes, the ACCC stated, "the Commission considers that the benefits of FRC will be facilitated by a single metrology procedure. The Commission, therefore, amended the Code to require jurisdictional regulators to consider the costs and benefits of a single nationally consistent metrology procedure in their joint review".[111]

8.3 Published metrology procedures

Metrology procedures for metering installation types 5, 6 and 7 have been published for Victoria, NSW, South Australia and the ACT. Queensland is currently developing its metrology procedures, whilst Tasmania does not have a metrology procedure.

8.3.1 Major differences between the jurisdictional metrology procedures

In the development of the published metrology procedures, considerable consistency across jurisdictions has already been achieved. However, some market and policy differences across jurisdictions have resulted in differences in metrology provisions. Key jurisdictional differences in metrology provisions relate to:

- The form of profiling that is applicable in each jurisdiction;
- The role of the Responsible Person in, and the metering required for, embedded networks;
- Policy for the "non reversion" of interval meters, as discussed in section 6.2;
- Use of Accredited Service Providers for installing meters in New South Wales;
- The threshold below which type 6 metering installations may be used in the jurisdiction;
- First tier metering data that must be sent to NEMMCO for deriving the profile; and
- On and off times for unmetered supplies controlled by photoelectric (PE) cells, principally streetlighting.

[109] ACCC, *ibid,* p.7
[110] ACCC, *ibid,* p.6
[111] ACCC, *ibid*, p.15

These major differences, and the rationale for these differences, are detailed further in Appendix H.

8.3.2 Minor differences between the jurisdictional metrology procedures

Additionally there are minor differences between the published metrology procedures. These minor differences have arisen due to:

- Differences in the legal and regulatory framework resulting in minor differences in many of the definitions, for example, the wording of the definitions of Act, Minister, licence are specific to that jurisdiction, and different regulators and first tier metering instruments are referred to;
- Minor word changes that were requested and agreed to in the various jurisdictions. These differences generally did not change the intent of the clause; and
- The timing of the development of the metrology procedure. The metrology procedures have been refined over the last couple of years. These amendments have been included in some jurisdiction's metrology procedures but not in others.

8.3.3 Provisions in the metrology procedure that are also in NEMMCO documents

There are currently a number of provisions in the metrology procedure that are reasonably consistent across the jurisdictions and are also replicated in NEMMCO documents. The Code currently requires these provisions to be replicated. Thus there is a need to ensure that both the metrology procedures and the NEMMCO documents remain consistent.

The types of obligations that are currently replicated are:

- Validation, substitution and estimation of metering installations types 5, 6 and 7[112]. These schedules are reasonably consistent across the jurisdictions and are replicated in the validation and substitution procedures developed by NEMMCO under clause 7.9.4(b) of the Code[113].
- Capabilities for Metering Providers for metering installations types 5, 6 and 7[114]. The content of these schedules is provided in NEMMCO's Service Level Requirements for Metering Providers[115].
- Profiling algorithms[116]. The profiling algorithms must be consistent with the functionality of NEMMCO's MSATS system and are therefore more appropriately included in a NEMMCO technical document, to be developed.

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[112] Published jurisdictional metrology procedures, Schedules 6, 7, 8, 9 and 12

[113] NEMMCO, *NEM metering Data Substitution Estimation and Validation Procedure for Metering Types 1 – 7* available at www.nemmco.com.au/operating/metering/700-0118.pdf

[114]Published jurisdictional Metrology Procedures, Schedules 14, 15 and 16

[115] The Service Level Requirements are available at www.nemmco.com.au/operating/metering/1681.htm

8.3.3.1 Changes required to Code to remove duplicate provisions

Code changes are required to remove the requirement to include provisions in the metrology procedure that are replicated in NEMMCO documents. Clause 7.3.1 of the Code provides guidance to the Metrology Coordinator in relation to the development of metrology procedures. In particular, clause 7.3.1(ba)(3) states that the metrology procedures must be prepared in accordance with:

- The relevant requirements of a metering installation in accordance with, amongst other things, clause 7.9.3. Clause 7.9.3(b) requires profiling algorithm(s) for type 6 metering installations to be included in the metrology procedure;
- Guidelines for the development of an asset management strategy in accordance with schedule 7.3. Schedule 7.3.1(c) refers to the data storage and processing components, including profiling algorithms, that are included in the metrology procedures; and
- Relevant capabilities and acceptable standards of performance of Metering Providers in accordance with Schedule 7.4.

8.3.4 Jurisdictional Metering Code or similar

The Code, and therefore the metrology procedure, only regulates second tier metering for the purposes of wholesale market settlement[117].

A separate jurisdictional instrument is required to regulate first tier metering and second tier metering for the purposes of customer billing and consumer protection. To minimise the barriers for customers switching retailers, many of the technical requirements for first tier metering in the jurisdictional instrument refer to the requirements for second tier metering in the relevant metrology procedure or the Code.

Additionally, in accordance with clause 7.9.4(b) of the Code, clause 3.10 of the published metrology procedure provides direction to NEMMCO to manage first tier data to develop the profile. An obligation is placed on NEMMCO to refer to a first tier instrument "for all requirements, additional to those provided in this clause 3.10, relating to metering of first tier loads, including without limitation, the quality and timeliness of the energy data for first tier loads and the party to be responsible for providing the energy data for first tier loads".

Any amendments to the metrology procedures need to consider the consequential amendments that may be required to other jurisdictional instruments.

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[116] Published jurisdictional metrology procedures, Schedule 10

[117] National Electricity Code, clause 7.1.1(b)

8.4 Role of Metrology Coordinator

Each of the jurisdictions was required, under the Code[118], to appoint a Metrology Coordinator to be responsible for designing and approving the initial metrology procedure(s) for metering installation types 5, 6 and 7. In all jurisdictions except Queensland the Government developed the initial metrology procedures. The Code required that the role of Metrology Coordinator be transferred to the relevant jurisdictional regulator from the date that FRC commenced or 1 January 2003, whichever was the earlier.

The jurisdictional regulators' main focus is generally on regulatory issues rather than the detailed technical issues associated with metering to settle the wholesale market. They are therefore well placed to assume responsibility for the regulatory issues in the metrology procedures but are not as well placed to assume responsibility for the detailed technical issues in the metrology procedures in the longer term.

NEMMCO has the skills to maintain the detailed technical requirements in the metrology procedures. However, if NEMMCO were to have responsibility for some or all of the metrology procedures, then various clauses of the Code would need to be amended.

Clause 7.2.1A of the Code declares the Jurisdictional Regulator to be the Metrology Coordinator responsible for metrology procedures. Further, clause 7.3.1(ba) of the Code states that the metrology procedures are to be prepared and revised by the Metrology Coordinator. Therefore, to move this responsibility to a single national body, such as NEMMCO, would require a Code change to allow for a different person to be the Metrology Coordinator.

Also, clause 7.2.5(aa) states that a Responsible Person must only use a metrology procedure in the jurisdiction in which that metrology procedure is approved. That is, the NSW metrology procedure, for example, may only be used for metering installations types 5 or 6 in NSW. Therefore, this clause may need to be amended to accommodate the use of a national metrology procedure in the jurisdictions.

Thus, to effect any of the options without a Code change in relation to the Metrology Coordinators would require a metrology procedure in some form to be retained in each jurisdiction. However, this could be a relatively short document that referred to the relevant national document(s).

8.5 Options for nationally consistent metrology procedures

One of the objectives of this review is to identify options for developing metrology procedures that are more consistent nationally. The options that have been identified are as follows:

[118] National Electricity Code, clause 7.2.1A

Option 1 Maintaining the status quo, that is, continuing with the jurisdictional metrology procedures with no changes

Option 2 Continuing with the jurisdictional metrology procedures in their current form but conducting a joint review to remove the minor differences that currently exist (refer section 8.3.2).

Option 3 Amend the jurisdictional metrology procedures so that:

- the minor differences that currently exist across the jurisdictions are consistent (refer section 8.3.2); and
- the obligations that are reasonably consistent across the jurisdictions and are duplicated in NEMMCO documents are removed (identified in section 8.3.3).

Option 4 Remove from the jurisdictional metrology procedure all provisions that are reasonably similar into a new common NEMMCO document. The obligations that are already duplicated in NEMMCO documents will be removed from the jurisdictional metrology procedures but not included in the new common NEMMCO document.

Option 5 All provisions in the jurisdictional metrology procedures that are reasonably similar will be placed in a new common NEMMCO document. The obligations that are already duplicated in NEMMCO documents will not be duplicated in any other instrument. Where there are currently major differences between the jurisdictional metrology procedures, the new common NEMMCO document will refer to the jurisdictional Metering Code or similar.

Option 6 All provisions in the jurisdictional metrology procedures that are reasonably similar will be placed in a new common NEMMCO document. The obligations that are already duplicated in NEMMCO documents will not be duplicated in any other instrument. Where there are currently major differences between the jurisdictional metrology procedures, the new common NEMMCO document will include tables identifying the different jurisdictional positions in a similar way to the existing CATS procedures[119].

Option 7 All provisions in the jurisdictional metrology procedures that are reasonably similar will be placed in a new common NEMMCO document. The obligations that are already duplicated in NEMMCO documents will not be duplicated in any other instrument. Where there are currently major differences between the jurisdictional metrology procedures, the new common NEMMCO document will include tables identifying the different

[119] NEMMCO, *MSATS Procedures: CATS Procedures, Part 1 Principles and Obligations*

jurisdictional positions in a similar way to the existing CATS procedures[120]. All metering provisions in other jurisdictional instruments that are not related to customer billing or customer protection provisions will also be included in the new common NEMMCO document.

8.6 Comparison of the options for nationally consistent metrology procedures

The costs associated with managing the metrology procedure, for both regulators and participants, would be expected to be minimised by:

- Reducing the number of regulatory instruments in the NEM; and
- Maximising consistency across jurisdictions.

From a practical perspective, consistency facilitates greater levels of compliance and reduces compliance costs to participants. It is easier to maintain consistency across NEMMCO and jurisdictional instruments, if there is no overlap and the number of instruments is reduced.

Furthermore, a reduction in the number of instruments will reduce the barriers that may exist for retailers to enter multiple jurisdictional markets.

The advantages and disadvantages of each of the options identified in the previous section are provided in Appendix F.

Broadly, the options are for the jurisdictional regulators to continue to be responsible for the jurisdictional metrology procedures or for the provisions in the metrology procedures to be transferred, to a greater or lesser degree, to NEMMCO. Changes to the Code would be required to remove certain obligations from the metrology procedures and to transfer responsibility for part or all of the metrology procedures to NEMMCO.

There are market and policy differences across jurisdictions that will drive different outcomes, particularly with respect to, for example, the form of profiling, interval meter "non-reversion" policies and embedded networks. However, a number of options have been proposed that retain these key policy differences but maximise consistency in all other respects thereby reducing the number of instruments. This may be achieved by removing all provisions from the jurisdictional metrology procedures, with the exception of the jurisdictional policy differences, and placing them in a NEMMCO instrument. The jurisdictional policy differences could also be accommodated through a NEMMCO instrument similar to the CATS rules that tabulates the jurisdictional differences.

[120] NEMMCO, *ibid*

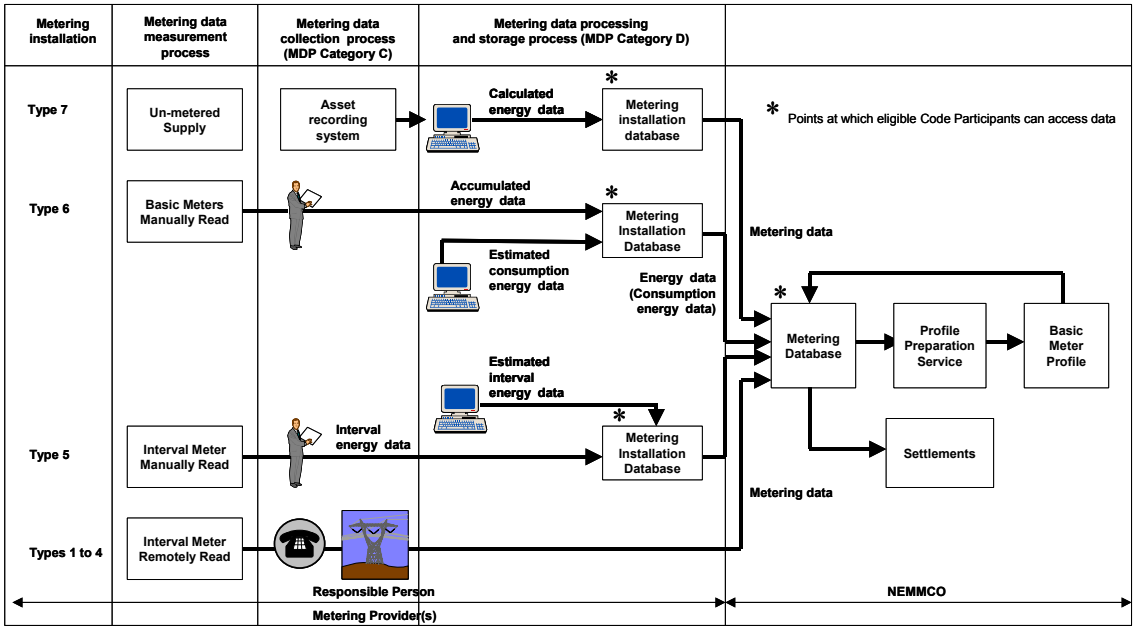
Issue No. 9

In this section, the options for improving the efficiency of the metrology procedures by increasing the extent to which the jurisdictional metrology procedures are consistent, have been discussed. Comment is sought in relation to the whether there should be greater consistency across the jurisdictional metrology procedures for metering installation types 5, 6 and 7. What are the benefits realisable from greater national consistency across the metrology procedures? Should responsibility for some or all of the metrology procedures be transferred from the jurisdictional regulators to NEMMCO? Are there any additional options for developing a greater level of national consistency across the metrology procedures for metering installation types 5, 6 and 7 that should be considered? Has the discussion, including the comparison of options in Appendix F, considered adequately the issues related to furthering consistency across the Metrology Procedures?

A Appendix A: Current jurisdictional metering arrangements

A.1 Description of the different types of metering installations

The following diagram outlines the metering installation types including the processes for measuring, collecting, processing and storing data from each metering installation type.



Metering installation types 1 to 4 consist of an interval meter, which is a meter that records the energy consumption in half-hourly intervals. The energy data is collected from the meter remotely at a frequency that meets NEMMCO's settlement timetable. Metering installation types 1 to 4 are used for larger consumers.

Metering installation type 5 consists of an interval meter and is used for smaller consumers. The energy data is collected from the meter on a frequency that exceeds NEMMCO's settlement week, generally on either a monthly or quarterly basis. The energy data may be collected either:

- Manually - a meter reader collects the data from the meter at the site of the meter using a meter reading device; or
- Remotely - data is collected using a communications link from the meter.

Metering installation type 6 consists of a non-interval meter, which does not record the energy consumption in half hourly intervals. The energy data is collected from the meter on a frequency that exceeds NEMMCO's settlement week, generally on either a monthly or quarterly basis.

The consumption data can be converted to half hourly interval data by NEMMCO by applying a profile. Profiling involves:

- Estimating an average profile of a class, or classes, of customers over a given period of time; and
- Allocating that profile to each customer in that customer class or classes on the basis of total measured consumption, which can be measured using the existing meters.

The majority of first tier customers[121] and small second tier customers[122] do not have interval meters installed. The Code allows the use of profiling to simulate half-hourly consumption for these smaller second tier customers. This type of metering installation is allowed to reduce the cost of, and to promote, customer switching for smaller consumers.[123]

Metering installation type 7 refers to the calculation of the energy consumption for an unmetered supply, that is, where there is no meter. Unmetered supplies generally include sites such as street lighting, traffic lights and similar loads which do not generally justify the expense of individual metering.

In general terms, energy consumption is calculated from the known characteristics of the device involved and estimated time of use. The energy data for a type 7 metering installation is made available within the NEMMCO settlement timetable.

Further details on each of these metering installation types are provided in the Code and the relevant metrology procedures.

[121] The retailer for a first tier customer is the local retailer for the area.

[122] The retailer for a second tier customer is a retailer other than the local retailer for the area.

[123] ACCC, *ibid*, p.5

A.2 Current jurisdictional metering arrangements

The current metering arrangements for each of the jurisdictions are provided in the following table:

Table 4: Current jurisdictional metering arrangements

Jurisdiction	First tier metering	Second tier metering
Victoria	■ Accumulation meters generally installed ■ Interval meters installed where the customer elects (and pays) or where the distributor elects (new and replacement) ■ Interval meters must be read as an interval meter ■ Off peak loads generally separately metered and controlled using time switches	■ Sub 160 MWh pa customers may switch retailers on the basis of a type 5 or 6 metering installation ■ Customers above 160 MWh pa switch retailers on the basis of a remotely read interval meter ■ All type 6 metering installations settled on the basis of a Net System Load Profile ■ Off peak loads generally separately metered and controlled using time switches
New South Wales	■ Accumulation meters generally installed ■ New and replacement meters for customers consuming greater than 160 MWh per annum must be interval meters ■ Interval meters installed where the customer elects (and pays) or where the distributor elects (new and replacement) ■ Interval meters may be read as an accumulation or interval meter ■ Off peak loads separately metered and controlled using ripple control receivers	■ Customers consuming between 100 and 160 MWh per annum must switch retailers on the basis of a type 5 metering installation ■ Customer consuming less than 100 MWh per annum may switch retailers on the basis of a type 5 or 6 metering installation ■ Customers above 160 MWh pa switch retailers on the basis of a remotely read interval meter ■ Meters for controlled off peak loads are settled on the basis of a Controlled Load Profile ■ Remaining type 6 metering installations settled on the basis of a Net System Load Profile ■ Off peak loads separately metered and controlled using ripple control receivers

Jurisdiction	First tier metering	Second tier metering
ACT	■ Accumulation meters generally installed ■ Interval meters installed where the customer elects (and pays) or where the distributor elects (new and replacement) ■ Interval meters must be read as an interval meter ■ Hot water loads not necessarily separately metered or controlled	■ Customer consuming less than 160 MWh per annum may switch retailers on the basis of a type 5 or 6 metering installation ■ Customers above 160 MWh pa switch retailers on the basis of a remotely read interval meter ■ All type 6 metering installations settled on the basis of a Net System Load Profile ■ Hot water loads not necessarily separately metered or controlled
South Australia	■ Accumulation meters generally installed ■ All customers consuming greater than 750 MWh per annum have an interval meter installed ■ Interval meters installed where the customer elects (and pays) ■ Interval meters must be read as an interval meter ■ Off peak loads separately metered and controlled using time switches	■ Customer consuming less than 160 MWh per annum may switch retailers on the basis of a type 5 or 6 metering installation ■ Customers above 160 MWh pa switch retailers on the basis of a remotely read interval meter ■ Meters for controlled off peak loads are settled on the basis of a Controlled Load Profile ■ Remaining type 6 metering installations settled on the basis of a Net System Load Profile ■ Off peak loads separately metered and controlled using time switches
Queensland	■ Accumulation meters generally installed ■ Interval meters installed where the customer elects (and pays) or where the distributor elects (new and replacement) ■ Off peak loads separately metered and controlled using ripple control receivers	■ Customers consuming less than 200 MWh per annum not able to switch retailers ■ Customers above 200 MWh pa switch retailers on the basis of a remotely read interval meter ■ Off peak loads separately metered and controlled using ripple control receivers

Jurisdiction	First tier metering	Second tier metering
Tasmania	■ Accumulation meters generally installed ■ Interval meters installed where the customer elects (and pays) or where the distributor elects (new and replacement) ■ Off peak loads separately metered and controlled ■ Highest penetration of prepayment meters	■ Tasmania has not entered NEM ■ No retail competition for small customers in Tasmania

The numbers of meters installed in each of New South Wales, Queensland, South Australia, and Victoria, in broad terms are as follows:

Type of meter	Number of customers	
	Small customers	Large customers
Accumulation meters		
General purpose	100,000's – 1,000,000's	1,000's – 10,000's
Controlled off peak	30 – 70% of accumulation meters	
Time of use meters	10,000's	100's – 10,000's
Interval meters	1,000's – 10,000's	1,000's

The number of meters installed in Tasmania and the ACT is proportionately less than those in the above table.

B Appendix B: Comparison of meter and other technology options

Each of the meter and other technology options identified in section 3.6 are compared within the assessment framework in the following table.

Option	Economic efficiency	Practicality	Equity
Option 1 Accumulation meters with additional profiling algorithms, either profiles prepared and applied over a smaller profile area or more profiles within the same profile area (eg CLP)	■ Additional costs to implement additional profiles ■ More efficient pricing signal for each profile but not between consumers on the profile ■ May allow additional allocative efficiencies to be captured, but likely to be minimal	■ Ability to identify and implement additional profiles ■ Metrology procedures would need to be amended to incorporate additional profiling algorithms	■ Profiles may become more representative and reduce the extent to which costs are smeared across customer classes (i.e. cross subsidies) ■ Large first tier customer loads distort profile ■ Where customers can elect to switch retailers on the basis of profiling, does not create a barrier to customers switching retailer

Option	Economic efficiency	Practicality	Equity
Option 2 Accumulation meters with improved profiling algorithms by, for example, requiring all customers above 160 MWh per annum to install interval meters, and netting off these loads to prepare the profiles	■ Additional cost for installing interval meters to larger customers and for managing the interval data ■ Allow for more cost reflective price signals for profile but not between consumers on the profile ■ Allows productive efficiencies to be captured but not allocative efficiencies	■ Jurisdictional instruments would need to be amended to require interval meters to be installed for first tier >160 MWh pa customers	■ Smears costs across customer classes (i.e. cross subsidies) ■ Profile more representative ■ Where customers can elect to switch retailers on the basis of profiling, does not create a barrier to customers switching retailer ■ Equity for all customers consuming above threshold – all required to install interval meters, whether first tier or second tier

Option	Economic efficiency	Practicality	Equity
Option 3 Time of use meters with existing profiling algorithms	■ Slightly higher cost relative to interval meters - Meter provision – meter, installation, maintenance, shorter meter life - Metering data services – incremental increase in volume of data relative to accumulation meters but significantly less than interval meters ■ Able to identify consumption in "buckets" but not on specific days – will facilitate capture of allocative efficiencies from shifting load but not from reducing load on needle peak days	■ Some of the benefits accrue to distribution businesses, but uncertainty related to incentives provided to customers by retailers to adopt TOU meters and tariffs ■ Jurisdictional instruments would need to be amended to require TOU meters to be installed	■ Second tier customers settled in wholesale market based on profile – costs continue to be smeared across customer classes (i.e. cross subsidies)

Option	Economic efficiency	Practicality	Equity
Option 4 Time of use meters with additional profiling algorithms	■ Slightly higher cost relative to interval meters - Meter provision – meter, installation, maintenance, shorter meter life - Metering data services – incremental increase in volume of data relative to accumulation meters but significantly less than interval meters ■ Costs associated with additional profiles ■ Able to identify consumption in "buckets" but not on specific days – will facilitate capture of allocative efficiencies from shifting load but not from reducing load on needle peak days	■ Some of the benefits accrue to distribution businesses, but uncertainty related to incentives provided to customers by retailers ■ Jurisdictional instruments would need to be amended to require TOU meters to be installed ■ Metrology procedure would need to be amended to incorporate additional profiling	■ Profile may become more representative and therefore reduce the extent to which costs are smeared across customer classes (i.e. cross subsidies)

Option	Economic efficiency	Practicality	Equity
Option 5 Interval meters – manually read	■ Higher cost relative to accumulation meters - Meter provision – meter, installation, maintenance, shorter meter life - Metering data services – significant additional volume of data to be managed relative to accumulation and TOU meters ■ Able to identify consumption on specific days and in specific intervals – will facilitate capture of allocative efficiencies from reducing and shifting load	■ Delay between critical peak periods and billing – tariff structures need to be simple and enable consumers to easily recognise when a critical peak period will occur ■ Alternatively, pricing signals need to relatively static or accessed readily through the internet for example ■ Some of the benefits accrue to distribution businesses, but uncertainty related to incentives provided to customers by retailers through tariff ■ Ability of consumers to reconcile meter reading on bill	■ Extent to which costs will continue to be smeared across customer classes (i.e. cross subsidies) will be dependent on tariff structures ■ Higher costs associated with interval meters may be a barrier to new retailers ■ If interval meters mandated for second tier customers but are not part of an accelerated roll out program, there will be a barrier to customers switching retailer

Option	Economic efficiency	Practicality	Equity
Option 6 Interval meters – remotely read	■ Higher cost relative to manually read interval meters - communication infrastructure and equipment ■ Able to identify consumption on specific days and in specific intervals – will facilitate capture of allocative efficiencies from reducing and shifting load	■ Meters can be read more frequently to provide faster feedback to customers on impact of consuming on needle peak days – more complex tariff structures may be possible ■ Pricing signals need to relatively static or accessed readily through the internet for example ■ Some of the benefits accrue to distribution businesses, but uncertainty related to incentives provided to customers by retailers ■ Ability of consumers to reconcile meter reading on bill ■ Risks associated with accelerating roll out of a technology that has not been used on such a large scale in Australia	■ Extent to which costs will continue to be smeared across customer classes (i.e. cross subsidies) will be dependent on tariff structures ■ Higher costs associated with interval meters may be a barrier to new retailers ■ If interval meters mandated for second tier customers but are not part of an accelerated roll out program, there will be a barrier to customers switching retailer ■ Ability to read meters remotely may facilitate customer transfers to a different retailer

Option	Economic efficiency	Practicality	Equity
Option 7 Interval meters – two way communication	■ Higher cost relative to manually read interval meters - communication infrastructure and equipment ■ Able to identify consumption on specific days and in specific intervals – will facilitate capture of allocative efficiencies from reducing and shifting load ■ Additional benefits – able to control load remotely during periods of peak demand, communicate peak pricing periods, remote disconnection and reconnection ■ Greater potential for allocative efficiencies ■ Distributor able to control load rather than relying on consumer to respond	■ Meters can be read more frequently to provide faster feedback to customers on impact of consuming on needle peak days – more complex tariff structures may be possible ■ Enables real time feedback of pricing signals ■ Some of the benefits accrue to distribution businesses, but uncertainty related to incentives provided to customers by retailers ■ Ability of consumers to reconcile meter reading on bill ■ Risks associated with accelerating roll out of a technology that has not been used on such a large scale in Australia ■ Willingness of consumers to accept switching of loads	■ Extent to which costs will continue to be smeared across customer classes (i.e. cross subsidies) will be dependent on tariff structures ■ Higher costs associated with interval meters may be a barrier to new retailers ■ If interval meters mandated for second tier customers but are not part of an accelerated roll out program, there will be a barrier to customers switching retailer ■ Ability to read meters remotely may facilitate customer transfers to a different retailer

Option	Economic efficiency	Practicality	Equity
Option 8 Static load control	■ Cost associated with rewiring of control circuits ■ If peak loads switched, additional time switch and meter required ■ Allow for more cost reflective price signals, but limited to the number of meters ■ Might allow additional allocative efficiencies to be captured ■ Does not rely on consumer to respond to price signals	■ Inability to dynamically adjust on and off times of time switches based on specific network constraints ■ More feasible on new houses or buildings ■ Willingness of consumers to accept switching of loads ■ Jurisdictional instruments would need to be amended to require switching of loads	■ Costs would continue to be smeared across customer classes (i.e. cross subsidies) unless there are additional profiles ■ If installed in new houses or buildings, equity between those customers in new premises and those in existing premises

Option	Economic efficiency	Practicality	Equity
Option 9 Dynamic load control	■ Cost associated with rewiring of control circuits ■ If peak loads switched, additional ripple control receiver and meter required ■ If dynamic load control not already installed in jurisdiction, costs of establishing infrastructure ■ Allow for more cost reflective price signals, but limited to the number of meters ■ Might allow additional allocative efficiencies to be captured ■ Distributor able to control load rather than relying on consumer to respond	■ Able to dynamically adjust on and off times of time switches based on specific network constraints ■ More feasible on new houses or buildings ■ Willingness of consumers to accept switching of loads ■ Jurisdictional instruments would need to be amended to require switching of loads	■ Costs would continue to be smeared across customer classes (i.e. cross subsidies) unless there are additional profiles ■ If installed in new houses or buildings, equity between those customers in new premises and those in existing premises

C Appendix C: Comparison of deployment options

Each of the deployment options identified in section 3.7 is compared within the assessment framework in the following table.

Option	Economic efficiency	Practicality	Equity
Option a Meters or other technology installed for all customers	■ Maximise economies of scale – meter cost, installation cost, meter reading ■ Maximise allocative efficiencies ■ Greatest risk of stranding existing assets ■ If accelerated roll out, no profiling costs	■ Greatest logistical challenges	■ Potentially enables cost reflective tariffs to greater number of consumers ■ Costs not smeared for a greater number of customers

Option	Economic efficiency	Practicality	Equity
Option b Meters or other technology installed for groups of customers based on consumption	■ Loss of economies of scale – meter cost, installation cost, meter reading - extent of loss depends on consumption limit ■ Possibly reduced allocative efficiencies relative to deploying option to all customers ■ Risk of meter churn as consumption changes, without "non-reversion" policy ■ Risk of stranded assets – but lower risk than roll out to all customers	■ Potentially a much smaller number of customers – logistically simpler to manage ■ Metering of customers whose consumption varies around threshold level	■ If larger customers are no longer on profile, profile will be more representative of smaller customers ■ Cost reflective tariffs only to those with economically efficient metering solution ■ If consumption threshold is 160 MWh per annum, potentially consistent metering for large first and second tier customers ■ Costs smeared across customers not included in roll out

Option	Economic efficiency	Practicality	Equity
Option c Meters or other technology installed for groups of customers based on type of use	■ Loss of economies of scale – meter cost, installation cost, meter reading - extent of loss depends on type of use ■ Benefits can be maximised relative to cost if customers well chosen for roll out ■ Risk of meter churn as usage changes, without "non reversion" policy ■ Risk of stranded assets – but lower risk than roll out to all customers	■ Ability to identify target customers	■ Equity between customer classes can be improved substantially if customers well chosen for roll out ■ Profile will be more representative ■ If air conditioning customers targeted, profile may reduce in cost – more equitable for those with low peak loads

Option	Economic efficiency	Practicality	Equity
Option 1 Continue with existing "market based" approach	■ No economies of scale – meter cost, installation cost, meter reading ■ Benefits captured by specific customer but not by market as a whole ■ Risk of stranded assets, but minimal relative to other options ■ Risk of meter churn if customer's profile changes and there is no "non-reversion" policy		■ Costs of meter not smeared ■ Customers who choose to install an interval or TOU meter will generally have high off peak load and low peak load – profile will become more representative of the remaining customers ■ Customers with high peak load and more vulnerable customers will be left on a higher cost profile
Option 2 Implement additional profiling algorithms	■ Additional costs to implement and maintain profiles ■ More efficient pricing signal for each profile but not between customers on profile ■ May allow additional allocative efficiencies to be captured, but minimal	■ Ability to identify and implement profiles ■ Metrology procedures would need to be amended to incorporate additional profiling algorithms	■ Profiles may become more representative and reduce the extent to which costs are smeared across customer classes (i.e. cross subsidies) ■ Where customers can elect to switch retailers on the basis of profiling, does not create a barrier to customers switching retailers

Option	Economic efficiency	Practicality	Equity
Option 3 "Market based" approach where all second tier customers required to install interval meters	■ Reduction in the rate at which customers switch retailers might reduce the productive efficiencies arising from the introduction of competition ■ Minimal economies of scale – meter cost, installation cost, meter reading ■ Benefits captured by specific customer but not by market as a whole ■ No profiling costs ■ Risk of meter churn as customer changes retailer, without "non-reversion" policy	■ Need to have an interval meter installed before a customer can switch retailer	■ Creates a barrier for customers to switch retailers, subject to the cost recovery approach for these meters – customers will only switch if the benefits are greater than the cost of the interval meter ■ Costs of meter not smeared ■ Second tier customers not settled on basis of profiling – cost reflective tariffs for second tier customers ■ Costs continue to be smeared across first tier customers

Option	Economic efficiency	Practicality	Equity
Option 4 Accelerated roll out to all customers over a shorter time frame, say 5 years	■ Highest economies of scale – meter cost, installation cost ■ Any allocative efficiencies may be captured after 5 years ■ No profiling costs after 5 years ■ Risk of stranded assets	■ Logistics associated with rolling out meters over a relatively short time frame – manufacturing and installing meters, upgrading IT systems	■ Potentially all customers on cost reflective tariffs within 5 years ■ Transition period during which some customers paying for roll out but not receiving the full benefits ■ Transition period during which some customers face cost reflective tariffs and others do not ■ Cost of roll out smeared across all customers

Option	Economic efficiency	Practicality	Equity
Option 5 Accelerated roll out to all customers over a longer time frame, say 10 years	■ Reduced economies of scale relative to option 3 – meter cost, installation cost ■ Any allocative efficiencies may be captured more slowly than option 3, but could target roll out to areas where there are network constraints to maximise these allocative efficiencies ■ No profiling costs after 5 years ■ Risk of stranded assets	■ Logistics associated with rolling out meters – manufacturing and installing meters, upgrading IT systems	■ Potentially all customers on cost reflective tariffs within 10 years ■ Transition period during which some customers paying for roll out but not receiving the full benefits ■ Transition period during which some customers face cost reflective tariffs and others do not ■ Cost of roll out smeared across all customers

Option	Economic efficiency	Practicality	Equity
Option 6 New and replacement policy	■ Loss of economies of scale – meter cost, installation cost, meter reading ■ Minimise risk of stranded assets – new meter required ■ Incur installation cost regardless of type of meter installed ■ Depending on profile of customers, reduced capability to capture any allocative efficiencies ■ Long period of time before allocative efficiencies may be realised	■ Logistically, simpler to manage	■ Equity between those customers that have a meter through new and replacement policy and those that have to pay – may lead to wilful damage of meters ■ Only those customers with new and replacement meters have potential to be on cost reflective tariffs ■ Profiling and smearing of costs will continue for those with accumulation meters ■ Costs of meters smeared ■ Long transition period during which some consumers on cost reflective tariffs, and others not

D Appendix D: Comparison of alternative options for metering services

Each of the metering services options identified in section 4.5 is compared within the assessment framework in the following table.

Option	Economic efficiency	Practicality	Equity
Option 1 Introduce competitive metering services for small second tier customers	■ Opportunity for innovation in meter technology - not constrained to distributor's standard offering ■ Opportunity for innovation in metering data services – economies of scale combining meter reading route with other similar services ■ Risk of meter churn ■ Potential for increased costs due to loss of economies of scale – meter costs, testing of meters, meter reading – and lack of standardisation ■ Potential for efficiency gains not captured by distributor's competitive processes – small relative to electricity bill	■ Operational complexities – maintenance and testing of meters, universal metering, coordination of processes across multiple parties, load control ■ Competitive metering services cannot be introduced during current regulatory period, without customers paying twice – once through DUoS charges and once through Responsible Person ■ Retailers do not generally have skills to correctly manage Responsible Person obligations – risk of errors in metering data increases[124] ■ Default provider of metering services?	■ Innovative metering may provide greater opportunities for cost reflective pricing ■ Potential barrier to retailers without necessary skills and expertise, entering market ■ Potential barrier to customers switching retailers – potentially increased costs and "hassle" factor ■ Metering charges unbundled from DUoS charges and more cost reflective

[124] NEMMCO, *Annual Metering and Retail Development Report 2003*, p. 34

Option	Economic efficiency	Practicality	Equity
Option 2 Distributor continues to exclusively provide metering services for small second tier customers for a further transitional period	■ Opportunity for innovation in meter technology and metering data services for the period of exclusivity derogation – but unlikely due to uncertainties associated with a transitional period ■ Meters not churned ■ Economies of scale – meter costs, testing of meters, meter reading ■ Engage Metering Providers and procure meters on a competitive basis ■ Uncertainty of cost recovery over longer term – increase in costs	■ Need for exclusivity to be reviewed after a further transitional period ■ Uncertainty associated with transitional nature of derogation ■ Introduction of operational complexities delayed – provides a period during which new processes developed and tested ■ Exclusivity in some jurisdictions will need to be extended to be consistent with regulatory period	■ Costs of metering smeared across customers ■ Metering costs may need to be unbundled from DUoS charges during current price reviews to facilitate possible introduction of competitive metering services

Option	Economic efficiency	Practicality	Equity
Option 3 Distributor continues to exclusively provide metering services for small second tier customers in perpetuity	■ Greater opportunity for innovation in meter technology and metering data services with increased certainty – economies of scale and mechanism for smearing of costs ■ Retailers and customers constrained to distributor's standard offering ■ Meters not churned ■ Economies of scale – meter costs, testing of meters, meter reading ■ Engage Metering Providers and procure meters on a competitive basis ■ Greater certainty of cost recovery over longer term – reduce costs ■ Potential loss of efficiency gains through competition – likely to be minimal relative to electricity bill	■ All jurisdictions need to agree on this approach to enable Code to be amended ■ Operational complexities not introduced	■ Costs of metering smeared across customers ■ Metering costs do not need to be unbundled from DUoS charges

Option	Economic efficiency	Practicality	Equity
Option 4 Distributor continues to exclusively provide metering services for small second tier customers, except where the customer elects to pay for a meter other than the distributor's standard offering	■ Metering technology not constrained by distributor's standard offering ■ Customers that have distributor's standard meter installed continue to benefit from economies of scale ■ Lack of standardisation – distributor may be required, over time, to read a wide range of meters – increased costs ■ Potential for churning of these meters as retailers and customers change	■ Operational complexities, but not to the same extent as option 1	■ Customer that elects different meter pays the full costs associated with that choice, but potentially pays twice – once through DUoS and once through extra charge ■ Costs of metering smeared across customers ■ Metering costs do not need to be unbundled from DUoS charges

Option	Economic efficiency	Practicality	Equity
Option 5 Distributor continues to exclusively provide metering services for small second tier customers, but only for meter provision, maintenance and testing	■ Opportunity for innovation in meter technology for the period of exclusivity derogation – economies of scale and mechanism for smearing costs of meter provision ■ Meters not churned ■ Metering technology constrained by distributor's standard offering ■ Economies of scale – meter costs, testing of meters ■ Engage Metering Providers and procure meters on a competitive basis ■ Potential loss of economies of scale – meter reading. However, distributor's Metering Provider may be engaged by Responsible Person	■ Need to amend Code to allow competitive metering services for metering data services but not for meter provision ■ No operational complexities associated with meter provision ■ Operational complexities associated with metering data services	■ Costs of meter provision smeared across customers ■ Metering data services costs will need to be unbundled from DUoS charges ■ Barrier to customers switching retailers if retailer cannot engage Metering Providers for metering data services on a fair and reasonable basis ■ Barrier to retailers entering market if retailer does not have skill and expertise to assume responsibility for metering data services

Option	Economic efficiency	Practicality	Equity
Option 6 Distributor continues to exclusively provide metering services for small second tier customers, but only for metering data services	■ Metering technology not constrained by distributor's standard offering ■ Lack of standardisation in meters – increased costs ■ Economies of scale in meter reading routes ■ Engage Metering Providers and procure meters on a competitive basis ■ Potential loss of economies of scale – meter costs, testing of meters ■ Potential for meters to be churned as retailers and customers change	■ Need to amend Code to allow competitive metering services for meter provision but not for metering data services ■ No operational complexities associated with metering data services ■ Operational complexities associated with meter provision	■ Costs of metering data services smeared across customers ■ Meter provision costs will need to be unbundled from DUoS charges ■ Barrier to customers switching retailers if retailer cannot engage Metering Providers for meter provision on a fair and reasonable basis ■ Barrier to retailers entering market if retailer does not have skill and expertise to assume technical responsibility for meter provision

Option	Economic efficiency	Practicality	Equity
Option 7 Distributor exclusively provides metering services for all second tier customers consuming less than 160 MWh per annum	■ May reduce cost of metering for NSW customers consuming 100 – 160 MWh per annum – assets for these customers depreciated over a longer period of time	■ Only consumers affected – second tier customers in NSW consuming 100 – 160 MWh per annum (relatively small number) ■ Reduce complexities – currently 2 different regimes for customers in NSW with type 5 metering installations ■ Change in metering arrangements when contracts already established	■ Consistent approach across the jurisdictions ■ Same costs incurred by all customers with a type 5 metering installation ■ May remove barrier to customers switching retailer where costs of competitive metering outweighed benefits of switching retailers
Option 8 Distributor continues to exclusively provide metering services, but only for second tier customers consuming less than 100 MWh per annum	■ May increase cost of metering for customers consuming more than 100 MWh per annum (except NSW) – assets for these customers depreciated over a shorter period of time	■ Affects second tier customers in VIC, SA and ACT consuming 100 – 160 MWh per annum (relatively small number) ■ Introduces complexities – 2 different regimes for customers with type 5 or 6 metering installation, based on consumption ■ Change in metering arrangements when contracts already established	■ Consistent approach across the jurisdictions ■ May introduce barrier to customers switching retailer where costs of competitive metering outweigh benefits of switching retailers

Option	Economic efficiency	Practicality	Equity
Option 9 Introduce competitive metering services for first tier customers that consume above the threshold level of the exclusivity derogation	■ Opportunity for innovation in meter technology - not constrained to distributor's standard offering ■ Risk of meter churn ■ Potential for increased costs due to loss of economies of scale – meter costs, testing of meters, meter reading ■ Potential for increased costs due to lack of standardisation ■ Costs of metering for these customers is small relative to electricity bill	■ Operational complexities – maintenance and testing of meters, universal metering, coordination of processes across multiple parties	■ Consistent approach for all larger customers – metering will not present a barrier to these customers switching retailers ■ Costs of metering larger customers will be borne by those customers, i.e. not smeared across smaller customers

E Appendix E: Comparison of alternative meter ownership models

The alternative meter ownership models, proposed in section 5.6, are compared within the assessment framework in the following table.

Option	Economic efficiency	Practicality	Equity
Option 1 Meter ownership is vested with the retailer	■ Opportunity for innovation in meter technology - not constrained to distributor's standard offering ■ Risk of meter churn with change of retailer – cost to consumer may increase due to the level of uncertainty ■ Potential for increased costs due to loss of economies of scale – meter costs, testing of meters, meter reading. Costs will depend on purchasing power of retailer ■ Potential for increased costs due to lack of standardisation ■ Potential for efficiency gains not captured by distributor's competitive procurement processes – but likely to be small relative to electricity bill ■ Upfront costs associated with the transfer of ownership	■ Operational complexities – universal metering, coordination between parties ■ Responsible Person will need to be able to engage a Metering Provider that is able to read the meter and a Metering Provider for the testing and maintenance of the meter ■ Who will own load control equipment? ■ Who will take responsibility to ensure load control equipment is compatible with network requirements? ■ Logistics associated with removing meters from the regulatory asset base and transferring ownership to customers	■ Costs of meters not smeared and more cost reflective ■ Innovative metering may provide greater opportunities for cost reflective pricing ■ Potential barrier to retailers without necessary skills and expertise, entering market ■ Potential barrier to retailers without purchasing power to obtain meters at a low cost ■ Potential barrier to customers switching retailers – will need to have a meter that is compatible with retailer – able to be read by retailer's Metering Provider and provides data required by retailer's tariff offering ■ Potential for anti-competitive retailer behaviour

Option	Economic efficiency	Practicality	Equity
Option 2 Meter ownership is vested with the customer	■ Opportunity for innovation in meter technology - not constrained to distributor's standard offering ■ Risk of meter churn with change of occupant ■ Customer pays upfront cost of meter – no economies of scale ■ Potential for increased costs due to loss of economies of scale – testing of meters, meter reading ■ Potential for increased costs due to lack of standardisation ■ Upfront costs associated with the transfer of ownership	■ Operational complexities – universal metering, coordination between parties ■ Responsible Person will need to be able to engage a Metering Provider that is able to read the meter and a Metering Provider for the testing and maintenance of the meter ■ Who will own load control equipment? ■ Who will take responsibility to ensure load control equipment is compatible with network requirements? ■ Customer, as owner, will be responsible for compliance with standards ■ Logistics associated with removing meters from the regulatory asset base and transferring ownership to customers ■ Many customers not capable of, or interested, in meter ownership	■ Costs of meters not smeared and more cost reflective ■ Innovative metering may provide greater opportunities for cost reflective pricing ■ Potential barrier to customers switching retailers – will need to ensure that meter is compatible with retailer – able to be read by retailer's Metering Provider and provides data required by retailer's tariff offering

Option	Economic efficiency	Practicality	Equity
Option 3 Meter ownership is vested with the distributor	■ Greater opportunity for innovation in meter technology with increased certainty – economies of scale and mechanism for smearing of costs ■ Constrained to distributor's standard offering ■ Risk of meter churn minimised ■ Economies of scale – meter costs, testing of meters, meter reading ■ Greater certainty of cost recovery – cost to consumers reduced	■ Level of standardisation will facilitate the engagement of a Metering Provider that is able to read the meter ■ Distributor has the technical skills and expertise to engage appropriate Metering Provider for the testing and maintenance of the meter ■ Distributor will continue to own load control equipment ■ Distributor has the technical skills and expertise to ensure that load control equipment is compatible with network requirements ■ Distributor has the technical skills and expertise to ensure compliance with standards	■ Costs of meters smeared across customers ■ Potential barrier to customers switching retailers – will need to have a meter that is compatible with retailer – able to provide data required by retailer's tariff offering

Option	Economic efficiency	Practicality	Equity
Option 4 Meter ownership is vested with a third party	■ Extent to which meter technology is standardised or is innovative will be dependent on how the relationship with the third party is managed and what is the key incentive for that third party ■ May be constrained to third party's standard offering, depending on arrangements ■ Risk of meter churn may be minimised, depending on arrangements ■ May have economies of scale depending on arrangements – meter costs, testing of meters, meter reading ■ Greater certainty of cost recovery – cost to consumers may be reduced compared to ownership by retailer ■ Potential for efficiency gains not captured by distributor's competitive procurement processes – but likely to be small relative to electricity bill ■ Upfront costs associated with the transfer of ownership	■ If the meter technology is standardised, will facilitate the engagement of a Metering Provider that is able to read the meter ■ Who will own load control equipment? ■ Who will take responsibility to ensure load control equipment is compatible with network requirements? ■ Third party will require technical skills and expertise to ensure compliance with standards ■ Logistics associated with removing meters from the regulatory asset base and transferring ownership to the third party ■ Who will have the relationship with the third party – the customer, the retailer, the distributor or the Responsible Person?	■ Costs of meters may or may not be smeared, depending on the ease with which a customer's specific costs of metering can be identified ■ Potential barrier to retailers who does not have a relationship with third party ■ Potential barrier to customers switching retailers – will need to have a meter that is compatible with retailer – able to be read by retailer's Metering Provider and provides data required by retailer's tariff offering

Option	Economic efficiency	Practicality	Equity
Option 5 Meter ownership may be vested with the retailer, the customer, the distributor or a third party	■ Able to exercise choice as to which meter ownership option is the most appropriate under the specific circumstances ■ Can adopt either the distributor's standard meter or an innovative metering technology ■ Risk of meter churn for those that exercise choice ■ Choice as to whether economies of scale are accessed – meter costs, testing of meters, meter reading ■ Greater certainty of cost recovery – cost to consumers may be reduced compared to ownership by retailer	■ Operational complexities – particularly universal metering and coordination between a number of parties ■ Responsible Person will need to be able to engage a Metering Provider that is able to read the meter and a Metering Provider to test and maintain the meter ■ Who will own load control equipment? ■ Who will take responsibility to ensure load control equipment is compatible with network requirements? ■ Meter owner will require technical skills and expertise to ensure compliance with standards ■ Existing meters in regulatory asset base; new meters not in regulatory asset base ■ Extent to which customers are capable of, or interested in, exercising that choice	■ Costs of meters may or may not be smeared, depending on the ease with which a customer's specific costs of metering can be identified ■ Potential barrier to retailers who are reliant upon specific meter ownership options, entering market ■ Potential barrier to customer switching retailers if this results in a change of meter ownership ■ Potential barrier to customers switching retailers – will need to have a meter that is compatible with retailer – able to be read by retailer's Metering Provider and provides data required by retailer's tariff offering

F Appendix F: Comparison of the options for nationally consistent metrology procedures

The options for nationally consistent metrology procedures, which are identified in section 8.6, are compared in the following table.

Description of option	*Advantages*	*Disadvantages*
Option 1 Maintaining the status quo, that is, continuing with the jurisdictional metrology procedures with no changes.	■ No changes required to Code ■ No changes required to metrology procedures	■ No move towards national consistency ■ Jurisdictional Regulators retain responsibility for technical metering provisions ■ Continued need to ensure jurisdictional metrology procedures are consistent ■ Continued need to ensure metrology procedures are consistent with NEMMCO documents and systems ■ Continued need to ensure metrology procedures are aligned with first tier metering instrument
Option 2 Continuing with the jurisdictional metrology procedures in their current form but conducting a joint review to remove the minor differences that currently exist (refer section 8.3.2).	■ No changes required to Code ■ Minor differences between metrology procedures removed	■ Small step towards national consistency ■ Jurisdictional Regulators retain responsibility for technical metering provisions ■ Continued need to ensure jurisdictional metrology procedures are consistent ■ Continued need to ensure metrology procedures are consistent with NEMMCO documents and systems ■ Continued need to ensure metrology procedures are aligned with first tier metering instrument

Description of option	*Advantages*	*Disadvantages*
Option 3 Amend the jurisdictional metrology procedures so that: ■ the minor differences that currently exist across the jurisdictions are consistent (refer section 8.3.2); and ■ the obligations that are reasonably consistent across the jurisdictions and are duplicated in NEMMCO documents are removed (identified in section 8.3.3).	■ Metrology procedures consistent with NEMMCO documents and systems ■ Minor differences between metrology procedures removed	■ Changes to Code required ■ Jurisdictional Regulators retain responsibility for technical metering provisions ■ Continued need to ensure jurisdictional metrology procedures are consistent ■ Continued need to ensure metrology procedures are aligned with first tier metering instrument
Option 4 Remove from the jurisdictional metrology procedure all provisions that are reasonably similar into a new common NEMMCO document. The obligations that are already duplicated in NEMMCO documents will be removed from the jurisdictional metrology procedures but not included in the new common NEMMCO document.	■ Large proportion of current jurisdictional metrology procedures will be in one document ■ Jurisdictional Regulators only retain responsibility for key policy decisions underpinning metrology procedures	■ Changes to Code required ■ Continued need to ensure new NEMMCO common document is consistent with other NEMMCO documents and systems ■ Continued need to ensure metrology procedures are aligned with first tier metering instrument

Description of option	*Advantages*	*Disadvantages*
Option 5 All provisions in the jurisdictional metrology procedures that are reasonably similar will be placed in a new common NEMMCO document. The obligations that are already duplicated in NEMMCO documents will not be duplicated in any other instrument. Where there are currently major differences between the jurisdictional metrology procedures, the new common NEMMCO document will refer to the jurisdictional Metering Code or similar.	■ Metrology procedures consistent with NEMMCO documents and systems ■ Large proportion of current jurisdictional metrology procedures will be in one document ■ Jurisdictional Regulators only retain responsibility for key policy decisions underpinning metrology procedures	■ Changes to Code required ■ Continued need to ensure metrology procedures are aligned with first tier metering instrument ■ Need to retain a jurisdictional metrology procedure, that is referenced by NEMMCO document and identifies the major differences
Option 6 All provisions in the jurisdictional metrology procedures that are reasonably similar will be placed in a new common NEMMCO document. The obligations that are already duplicated in NEMMCO documents will not be duplicated in any other instrument. Where there are currently major differences between the jurisdictional metrology procedures, the new common NEMMCO document will include tables identifying the different jurisdictional positions in a similar way to the existing CATS procedures[125].	■ Metrology procedures consistent with NEMMCO documents and systems ■ Large proportion of current jurisdictional metrology procedures will be in one document ■ Jurisdictional Regulators only retain responsibility for key policy decisions underpinning metrology procedures ■ No jurisdictional metrology procedure	■ Changes to Code required ■ Continued need to ensure metrology procedures are aligned with first tier metering instrument

[125] NEMMCO, *MSATS Procedures: CATS Procedures, Part 1 Principles and Obligations*

Description of option	*Advantages*	*Disadvantages*
Option 7 All provisions in the jurisdictional metrology procedures that are reasonably similar will be placed in a new common NEMMCO document. The obligations that are already duplicated in NEMMCO documents will not be duplicated in any other instrument. Where there are currently major differences between the jurisdictional metrology procedures, the new common NEMMCO document will include tables identifying the different jurisdictional positions in a similar way to the existing CATS procedures[126]. All metering provisions in other jurisdictional instruments that are not related to customer billing or customer protection provisions will also be included in the new common NEMMCO document.	■ Metrology procedures consistent with NEMMCO documents and systems ■ Large proportion of current jurisdictional metrology procedures will be in one document ■ Jurisdictional Regulators only retain responsibility for key policy decisions underpinning metrology procedures ■ No jurisdictional metrology procedure ■ First and second tier metering requirements (except those relating to customer billing and customer protection) included in the one document	■ Changes to Code required

[126] NEMMCO, *ibid*

G Appendix G: International experience with competitive metering services

G.1 United Kingdom

Prior to the introduction of metering competition, Public Electricity Suppliers ("PESs") had a monopoly in the provision of metering and data services. Competition in the provision of half-hourly metering equipment was introduced in 1994. Competition in the provision of non half-hourly metering and data services was introduced from 1 April 2000. The introduction of metering competition in 2000 occurred at the same time that the PESs were required to separate their distribution function managerially and operationally.

Ofgem introduced metering competition because:

> *"If buyers of these services can exercise choice, and new service providers can enter the market, then costs are likely to fall and innovation in new services will be stimulated"* [127]*... "the more substantial benefits for energy consumers are likely to flow from the development of new services based on advanced metering technology"*[128].

Therefore, it would appear that the primary reason for introducing metering competition was because of the perceived benefit of innovation in new services.

G.1.1 Distributor obligations

Metering assets were to remain in the distribution business. Distributors are required to provide a default non-discriminatory meter provision and meter operation service in their distribution area. If a distributor sells its metering business, its metering obligations still remain, but it can meet its metering obligations by contract.

Metering services (excluding prepayment meter surcharges and certain special metering) are included in distribution price controls. Ofgem has proposed an adjustment mechanism to allow for the development of competition in meter provision and operation services. It was proposed that distribution price control revenues would be reduced by an estimate of the savings in avoidable costs associated with reduced activity in these areas, in comparison with the costs of providing these services in 1999/2000.

Ofgem plans to separate price controls for metering services from the start of the next distribution price control period in April 2005.

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[127] Ofgem. *Ofgem's strategy for metering: A consultation paper*. March 2001, p11

[128] Ofgem. *Ofgem's strategy for metering: A consultation paper*. March 2001, extract from the 'Summary' section.

G.1.2 Retailer obligations

The retailer is where no other arrangements have been made, responsible for making metering arrangements on behalf of a customer. However, a customer can make its own metering arrangements subject to the consent of the retailer (consent may not be unreasonably withheld).

General retail licence conditions include:

- Upon application made by any person, a supplier that owns a meter shall offer to enter into an agreement for the sale, hire or loan of the meter;
- The retailer is obligated to make an offer as soon as practicable after the receipt of an application;
- Retailers are prohibited from entering into any agreements for the provision of metering equipment which is intended or likely to restrict, distort or prevent competition in the supply of electricity; and
- Leased meters are included in the definition of "owned" meters.

Domestic supply retail licence conditions include:

- An outgoing retailer is not allowed to recover a meter that it owns when the incoming retailer has undertaken to give the outgoing retailer appropriate compensation for the meter;
- An outgoing retailer will remove its meter from a customer's premises as soon as is reasonably practicable following a written request from the incoming supplier.

G.1.3 Experience with competitive metering arrangements

In April 2000 two PESs sold their metering businesses:

- TXU Europe sold its metering business, excluding all meter assets, to Siemens; and
- Powergen Energy sold its metering business, including interval meter assets, to Invensys.

Ofgem viewed these sales as a positive development for metering competition because it introduced non-PES metering businesses which could be expected to increase transparency and reduce perception of cross subsidy or potential discrimination.

By May 2002, distributors owned all basic meters and about three quarters of interval meters in their distribution area[129].

Ofgem recently listed continuing obstacles to electricity retail competition. Metering was not mentioned except to address competition for dynamically teleswitched customers[130], that is customers with heating loads that are radio switched by the host supplier.

[129] Ofgem. *Ofgem's strategy for metering. Report on progress and next steps*. May 2002.

G.1.4 Conclusion

In conclusion:

- The key reason for moving to competitive metering was the perceived benefit of innovation in new services. It was not because there was abuse of monopoly power;
- The transition to effective metering competition has only occurred very recently;
- It can be inferred that retailer ownership of metering assets was thought to be a potential barrier to customers switching retailers. Therefore special requirements were placed on retailers to prevent anti-competitive behaviour;
- The introduction of metering competition has created regulatory challenges for the separation of price controls for metering services and other prescribed distribution services; and
- There is little evidence to suggest that competitive metering arrangements thus far have had a positive or negative impact on customers.

[130] Ofgem. *Domestic gas and electricity supply competition. Recent developments*. June 2003.

H Appendix H: Major differences between the published jurisdictional metrology procedures

The major differences between the published jurisdictional metrology procedures, which are identified in section 8.3.1 are detailed in the following table.

Difference	Victoria	New South Wales	South Australia	Australian Capital Territory
Profiling[131]	Net System Load Profile	Net System Load Profile. One or two Controlled Load Profiles scaled based on data from all controlled load (accumulation) meters.	Net System Load Profile. One Controlled Load Profile scaled using a load scaling factor.	Net System Load Profile
Embedded Networks – Responsible Person for child[132]	Responsible Person of child is Responsible Person of parent	Where child < 100 MWh per annum, Responsible Person is Responsible Person of parent	Responsible Person of child is parent's distributor	No embedded networks
Embedded Networks – type of metering[133]	Parent and child must have an interval meter installed	Parent and child must have same type of meter	Parent and child must have an interval meter installed	No embedded networks
Non-Reversion Policy[134]	Interval meter may not be replaced by an accumulation meter. Interval meter must be read as an interval meter.	Interval meter may not be replaced by an accumulation meter. Interval meter may be read as an accumulation meter.	Interval meter may not be replaced by an accumulation meter. Interval meter must be read as an interval meter.	Interval meter may not be replaced by an accumulation meter. Interval meter must be read as an interval meter.
Accredited Service Providers	No ASP scheme.	ASP scheme	No ASP scheme.	No ASP scheme.
Upper Limit for Type 6 Metering Installations[135]	160 MWh per annum	100 MWh per annum	160 MWh per annum	160 MWh per annum

[131] Schedule 10 of the respective Metrology Procedure
[132] Clause 1.2 of the respective Metrology Procedure
[133] Clause 2.2 of the respective Metrology Procedure
[134] Clause 2.3 of the respective Metrology Procedure
[135] Schedule 2, Ref 1.1 of the respective Metrology Procedure

Difference	Victoria	New South Wales	South Australia	Australian Capital Territory
First tier interval metering data netted off from Net System Load Profile[136]	Interval metering data > 40 MWh per annum from 1 January 2002, > 10 MWh per annum from 1 January 2003, all from 1 January 2005	All first tier interval metering data	All first tier interval metering data	Interval metering data > 100 MWh per annum from 1 March 2003, all from 1 March 2004
On and Off Times for Street Lighting[137]	On time at sunset, off time at sunrise	On time at sunset, off time at sunrise	On time at sunset, off time at sunrise	On time at sunset with specified delay, off time at sunrise with specified delay
Source: NSW Metrology Procedure version 2.0, Victorian Metrology Procedure version 2.5, South Australian Metrology Procedure version 1.0, ACT Metrology Procedure version 1.0				

H.1 Rationale for the major differences between the published jurisdictional metrology procedures

The major differences between the published jurisdictional metrology procedures arise from market and policy differences between jurisdictions. Before considering the options for developing nationally consistent metrology procedures, it is important to be able to at least acknowledge the rationale for the major differences between the jurisdictional metrology procedures and recognise that some of these differences will remain, irrespective of the option.

H.1.1 Profiling

All of the jurisdictions allow type 6 metering installations to be settled on the basis of a Net System Load Profile determined by profile area. The profile area is defined in the metrology procedures as the Transmission Node Identifiers (TNIs) that supply the distribution network of a distributor.

New South Wales and South Australia have elected to have a Controlled Load Profile for customers with a separately metered off peak hot water load, whilst Victoria and the ACT elected not to have a Controlled Load Profile.

Victoria concluded that the benefits of peeling off off-peak loads were outweighed by the costs and risks of doing so when FRC commenced.

[136] Clause 3.10 of the respective Metrology Procedure

[137] Schedule 11 of the respective Metrology Procedure

In the ACT a significant proportion of customers with electric hot water do not have this load separately metered as a result of historical practices. Accordingly, it was concluded that it was not equitable to have the energy for some customers with electric hot water settled on the basis of a Controlled Load Profile whilst others were settled on the basis of the Net System Load Profile.

There is a high proportion of customers in New South Wales that have their off peak hot water load controlled using ripple control receivers. The ripple control receivers are switched by the distributor based on the loading of the system. New South Wales did not want to provide any incentive for customers to move away from the controlled off peak load. There are two controlled load tariffs offered by the distributors. The take up rate of these tariffs varies by distributor. The distributors therefore have the option of having one Controlled Load Profile, if the proportion of customers on one of these tariffs is significantly more than the other tariff, or two Controlled Load Profiles if it can be justified based on the proportion of customers on each tariff.

The Controlled Load Profile shape in New South Wales is determined based on a sample of meters and is scaled from the meter readings of all controlled load accumulation meters, both first tier and second tier.

South Australia also has a relatively high proportion of customers with separately metered off peak hot water loads, and there is greater variability in the spot price between peak and off-peak times than in Victoria, for example. The Controlled Load Profile shape in South Australia is determined based on a sample of meters and is scaled by a load scaling factor to represent first tier controlled load accumulation meters. South Australia's distributor had historical data that demonstrated that the load scaling factor could be estimated with a reasonable degree of accuracy. As a result, the costs of the Controlled Load Profile were reduced substantially whilst still gaining the benefit.

H.1.2 Embedded networks

Inset networks (which give rise to the practice of 'reselling') typically occur in situations such as major shopping centres, airports, industrial parks and caravan parks, for example. They occur when customers (inset customers) are connected to a distribution network that is not operated by a licensed distributor; the operator of an inset network is exempt from holding a distribution licence.

The incoming load is metered at the entry point to the inset network, while in some cases the individual inset customers within the network are metered and in other cases they are not. The common load (or residual load) of that inset network may or may not be separately metered.

Where the common load is not separately metered, then that common load is calculated by subtracting the inset customers' loads (metered or estimated) from the incoming load to the inset network. For the purposes of MSATS, the inset network, in this case, is referred to as

an embedded network. The incoming load is referred to as the parent of the embedded network, and the inset customers are referred to as children of the embedded network.

However for historical reasons, some of the meters in rural areas of New South Wales have been connected in such a way as to create an embedded network. The provisions in the NSW Metrology Procedure for embedded network metering are therefore different to those in the other jurisdictions to retain equity for all farmers irrespective of how their metering has been connected to the distribution system.

H.1.3 Non-reversion policy

Victoria, South Australia and the ACT have non-reversion provisions whereby interval meters must be read as interval meters, and cannot be replaced by accumulation meters. These provisions have been included in the metrology procedure to support a transition towards interval metering. NSW has adopted a more "market based" approach and accordingly interval meters may not be replaced by accumulation meters, but may be read as accumulation meters.

H.1.4 Accredited Service Providers

New South Wales is the only state that has an Accredited Service Provider (ASP) scheme. Under the ASP scheme, electrical contractors can be accredited to connect electricity and to install single-phase meters. To ensure the continuation of the ASP scheme, the NSW Metrology Procedure was developed so that it accommodated the ASP scheme.

H.1.5 Upper limit for type 6 metering installations

The upper limit for type 6 metering installations is determined by the jurisdictions. Victoria, South Australia and the ACT have provided customers that consume less than 160 MWh per annum with the choice of switching retailers on the basis of a type 5 or a type 6 metering installation. The analysis indicated that customers who consume less than 160 MWh per annum might not be able to justify the cost of an interval meter. If they were only able to switch retailers on the basis of a type 5 metering installation then this would have been a barrier to competition.

Analysis done by New South Wales indicated that the cost of an interval meter was a small proportion of the electricity bill for a customer consuming more than 100 MWh per annum. Accordingly, these customers are not able to transfer retailers on the basis of a type 6 metering installation.

H.1.6 First tier interval metering data sent to NEMMCO

The metering data from all first tier interval meters in New South Wales and South Australia is sent to NEMMCO for netting off the profile on the basis that the number of first tier interval meters was small, and the cost for doing so was not significant.

A transitional timeframe was allowed in the ACT because the distributor did not have the equipment to read all first tier interval meters as interval meters and to send this data to NEMMCO by the commencement of FRC. A transitional timeframe was allowed in Victoria on the basis that the number of interval meters was small at the commencement of FRC and therefore the impact that the first tier metering data would have on the profile was immaterial.

H.1.7 On and off times for unmetered supplies controlled by PE cells

In the absence of more detailed analysis, the on and off times for unmetered supplied controlled by PE cells, in Victoria, New South Wales and South Australia, was determined to be sunset and sunrise. Significant analysis had been undertaken in the ACT to determine the on time relative to sunset and the off time relative to sunrise for each day of the year. The results of this analysis had been used to determine the energy consumed for approximately 10 years. The metrology procedure allowed the continuation of the existing practice.